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The Iron Age

THE NATIONAL METALWORKING WEEKLY

July 17, 1952

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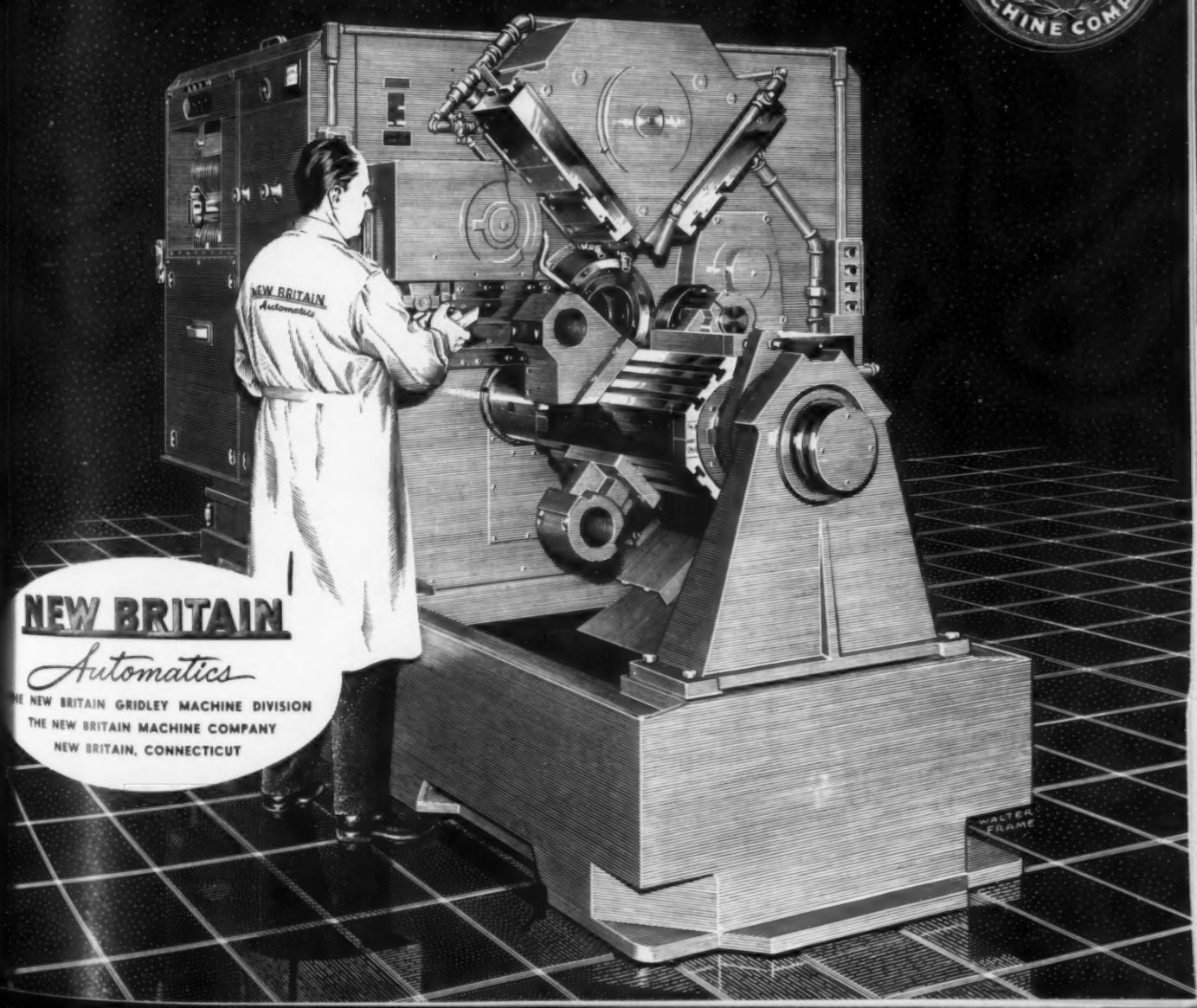
Invest in better methods for guaranteed returns

Automatic Bar and Chucking Machines • Precision Boring Machines

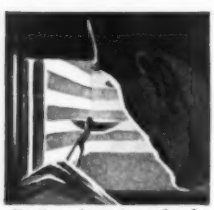
New Britain +GF+ Copying Lathes • Lucas Horizontal Boring, Drilling and Milling Machines

THE NEW BRITAIN MACHINE COMPANY

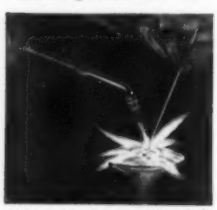


NEW BRITAIN
Automatics
THE NEW BRITAIN GRIDLEY MACHINE DIVISION
THE NEW BRITAIN MACHINE COMPANY
NEW BRITAIN, CONNECTICUT

How Much is a Good Spring Worth?



Heating elements made of Hoskins Chromel deliver full-rated power throughout their long and useful life.



Valves faced with Alloy 717 stand up under high temperatures and the corrosive action of hot exhaust gases.

Hoskins Chromel-Alumel thermocouple alloys accurately register exhaust temperatures of jet aircraft engines.

Springs are rather commonplace things . . . used in all sorts of products to perform all sorts of functions. So taken-for-granted are they, in fact, that the only time you really appreciate their worth (or lack of worth) is when they fail to do the job they're supposed to do.

And that's where Hoskins Alloy 769 really comes into its own. Because here is a *special* alloy that possesses some *very special* spring characteristics. For example, it's highly resistant to atmospheric and chemical corrosion. It has exceptional resistance to set and fatigue, which enables it to provide more constant delivery of torque over longer periods of time than ordinary spring material. It's non-magnetic, hard, and strong. Yet it can be cold-formed, heat-treated under controlled conditions, and welded, soldered, or brazed. What's more, it retains its desirable spring properties from sub-zero temperatures up to about 750° F.

Alloy 769 is only one of several special purpose alloys produced by Hoskins. Among the others the Chromel-Alumel thermocouple alloys . . . unconditionally guaranteed to register true temperature-e.m.f. values within close specified limits. Alloy 717 . . . for facing engine valves. Alloy 502 . . . widely used for heat resistant mechanical applications. Plus special spark plug electrode alloys which have long been the accepted standards for quality and durability. And, of course, there is Hoskins Chromel . . . the *original* nickel-chromium resistance alloy used as heating elements and cold resistors in countless different products for home and industry.

HOSKINS

MANUFACTURING COMPANY

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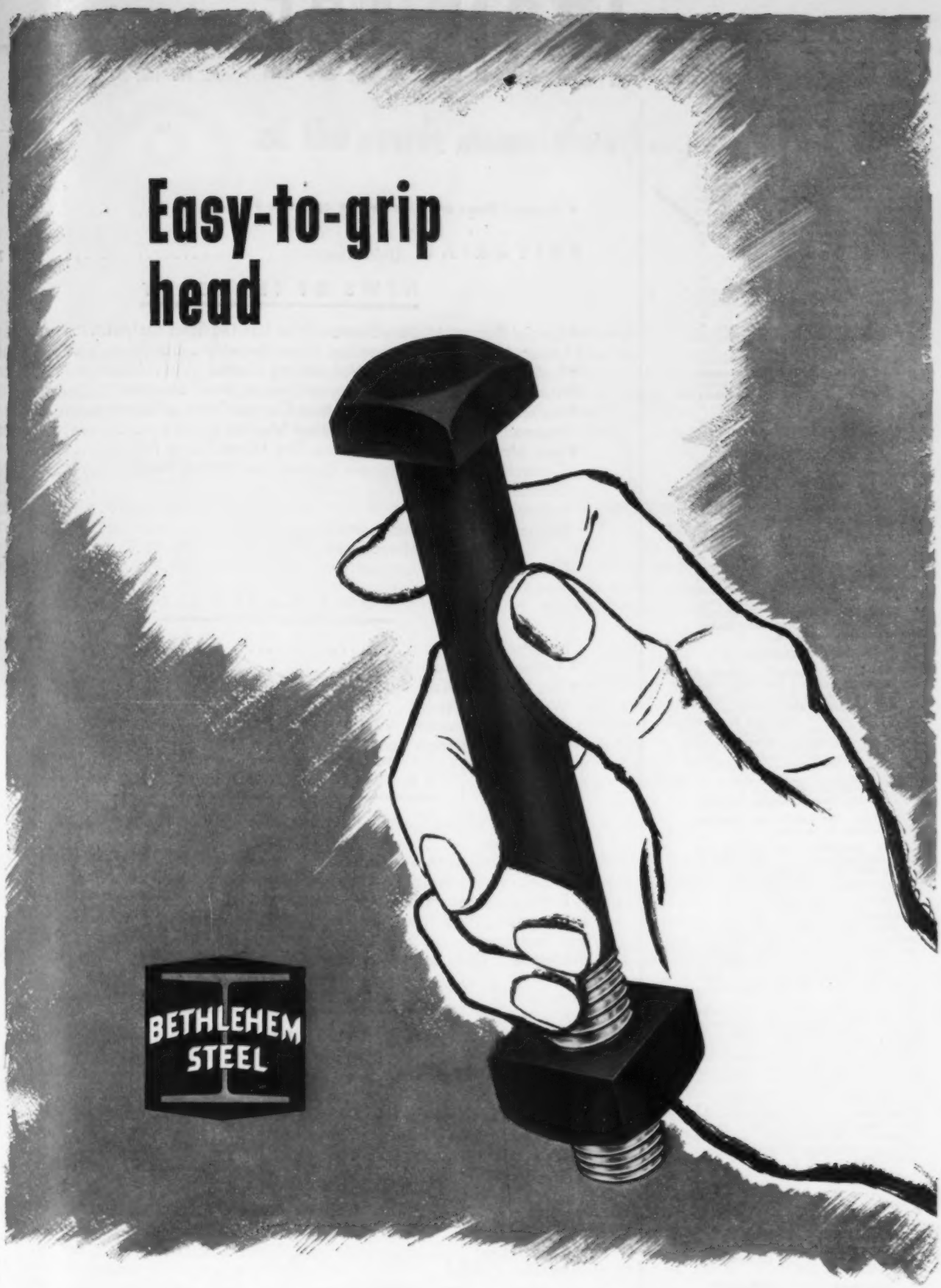
Chromel® NICKEL CHROMIUM WIRE



Bethlehem supplies every type of Fastener

IRON AGE

JULY 17, 1952
VOL. 170, No. 3

THE IRON AGE

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Circulation Representatives: Thomas Scott, James Richardson.

One of the Publications Owned and Published by Chilton Co., Inc., Chestnut & 56th Sts., Philadelphia 39, Pa.

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Indexed in the Industrial Arts Index and the Engineering Index. Published every Thursday by the CHILTON CO. (INC.), Chestnut & 56th Sts., Philadelphia 39, Pa. Entered as second class matter, Nov. 8, 1932, at the Post Office at Philadelphia under the act of March 3, 1879. $8 yearly in United States, its territories and Canada; other Western Hemisphere Countries, $15; other Foreign Countries, $25 per year. Single Copies 35c. Annual Review and Metal Industry Facts Issue, $2.00. Cable address "Ironage" N. Y.

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Society of Business Magazine Editors

CCA Controlled Circulation Audit

NBP National Business Publications

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DIGEST

of the week in metalworking

MILITARY SNATCHES ALL AVAILABLE STEEL

PAGE 83 Steel producers, consumers will see supply problems intensified when the strike ends. Reason: Military departments, AEC will move in to get steel they need before industry gets a sniff at it. This trend is in full bloom right now. Washington is seizing steel to be found in non-struck plants.

CAN WE MEET EVEN LOWER OIL WELL GOAL?

PAGE 85 First Washington wanted 85,000 new oil wells drilled in 1952. Sights went down to 50,000 later. Oil men realistically clung to a 45,000 figure. The steel strike throws the 50,000 well plan out the window. Lone Star Steel expansion will help. Yet many other factors work against PAD's goal.

CANNERS FEAR STRIKE TINPLATE SHORTAGE

PAGE 86 Will the steel strike empty grocery store shelves? Tinplate production has gone down with the strike. Meanwhile the canning season is approaching. Weirton Steel Co. is producing under NPA directive. But this output plus what's in warehouses will fill only one-third of canning requirements.

DAMAGED FURNACES WILL CUT STEEL OUTPUT

PAGE 87 Damaged openhearth refractories will be the biggest single obstacle in restoring full steel production when strike ends. It is impossible to fully appraise the damage until furnaces are reheated. Problem will vary from plant to plant. Coke ovens, blast furnace should be found relatively unharmed.

IDLED IRON ORE MINES ARE WASTING AWAY

PAGE 89 From the Mesabi Range come warnings that strike-idled iron ore mines are not receiving proper maintenance. By delaying return to full output, mine damage could worsen the already imminent ore shortage next winter. Personal inspection by an IRON AGE editor shows progressive damage.

DETROIT AUTO PLANTS RUN OUT OF STEEL

PAGE 102 Assembly lines have closed down as supplies of parts and steel vanished. Some are trying part-time operation, but the industry is virtually down dead. With pipelines competely empty, it will take months for a return to normal operations. Many defense plants are still able to keep going.

PERMANENT BOARD TO STUDY RESOURCES?

PAGE 107 Some feeling is stirring in Washington that National Security Resources Board should contain a permanent review body on natural resources. shortage problems and their solution. IMC statistics on scarce materials may be put to good use. NSRB is now studying Materials Commission findings.

END-QUENCH-HARDNESS PREDICTION EASIER

PAGE 125 A faster, better method has been developed for Jominy curve determination from the first 1/16 in. to the region of 50 pct martensite if both carbon content and D_r are known. Accuracy is reasonably good if the two basic factors are reliable. Method is not too accurate on boron steels.

ACCURATE BROACHES BY CRUSH GRINDING

PAGE 130 Crush grinding techniques over the last 10 years permit making quantities of broaches with identical accuracy. Small intricate shapes can be produced by modern crush grinding techniques. Accuracy of 0.0002 in. is not unusual. Cost of master is justified if quantities are greater than six.

SUCCESSFULLY FORM TITANIUM SHEETMETAL

PAGE 132 Titanium sheet is being successfully fabricated in web, channel, angle, and other forms. Heated dies are used in hydraulic and mechanical presses. Punches and dies are cut on bandsaws. Hot handwork is needed to remove wrinkles. Stretch forming is done. Machining uses CO_2 as the coolant.

EXPECT TIGHTER STEEL MARKET INTO 1953

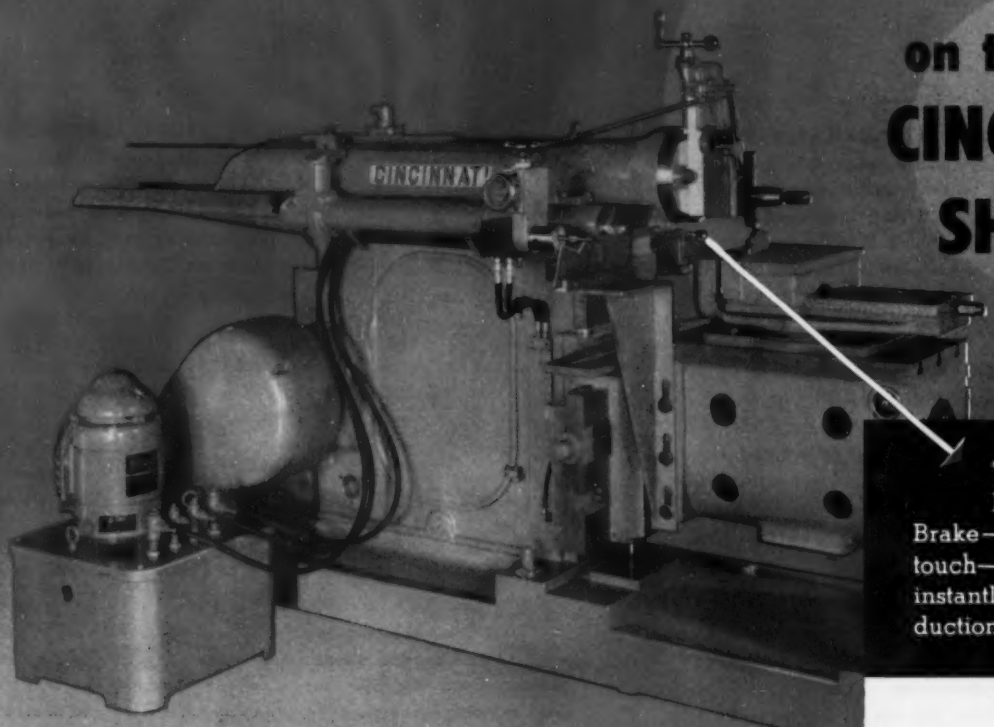
PAGE 181 Because of the strike steel supplies are expected to be tight through the first half of 1953. This wipes out prestrike predictions that the steelmaking rate would drop to 85 pct in the last quarter of this year. Auto companies are expected to furnish very strong demand, appliances to be weaker.

FERRITIC RODS WELD BETTER, SAVE ALLOY

NEXT WEEK Savings in strategic alloys of about 85 pct have been obtained by using ferritic rods instead of austenitic rods by Army Ordnance. Use is on military vehicles, up to 5/8-in. material thickness. Welds pass strict ballistic tests. Rods are low in hydrogen with alloy elements all in coating.

Do STANDARD SHAPING *and* AUTOMATIC DUPLICATING

on the *same* CINCINNATI SHAPER



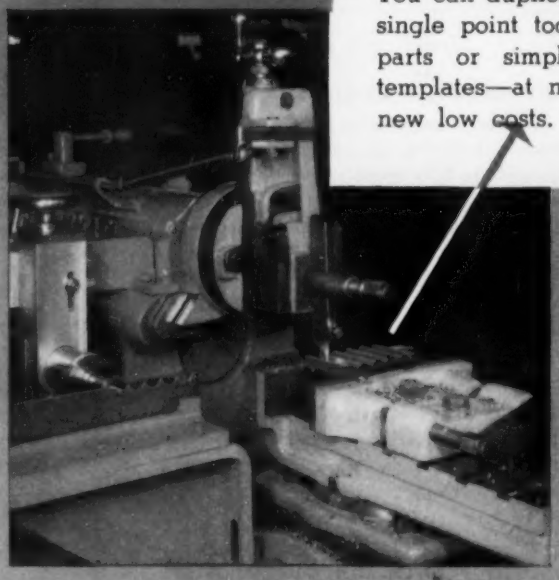
The powerful Cincinnati Magnetic Clutch and Brake—controlled with a finger touch—starts and stops the ram instantly, and speeds production.

YOU can change from Standard Shaping to Automatic Duplicating without a hitch on this hydraulic follower-equipped Cincinnati Shaper. The duplicating mechanism does not interfere with standard shaping operations.

The new Electro-Magnetic Clutch and Brake also brings greater ease of control and greater speed in operation.

A Cincinnati Shaper is the handy man of industry and will be versatile and profitable in your shop.

Write for Automatic Contour Duplicating Bulletin DN-1 and Catalog N-5.



You can duplicate parts with a single point tool, using actual parts or simple sheet metal templates—at new speeds and new low costs.

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the Iron Age
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Union Security

THE main issue unsettled in the steel fracas is the union's demand for a union shop. Neither side budged over the weekend.

The strike is costing workers, stockholders and government millions of dollars. The government is losing taxes. Steel customers will, by the end of this week, have lost about 15 million tons of steel.

What is this all about? The answer is simple. But it is hedged with so many half-baked statements from the government and the union that it looks complicated. It isn't at all.

The union called the strike to force a union shop on the steel industry. Mr. Murray wants the union shop for one or both of two reasons: (1) union monopoly and power for union officials in the steel industry or (2) union security.

Let's assume (for a moment only) that Mr. Murray is not trying for (1) union monopoly and power over steel employees. What about (2) union security?

In U. S. Steel Co. alone 92 pct of the employees belong to the union. No steel company official has shown the slightest trend or thought towards "union busting." Even if he did it would be a futile gesture.

Unions are here to stay. They are part of the national picture. Most steel people favor a strong union — if it becomes strong on its own merits. Time and time again steel management has shown by bargaining and by public statements that it wants to deal fairly with the steelworkers' union.

Mr. Murray knows in his heart that no steel firm or group of steel firms are trying to bust his union. He also knows that further assurances on union security can be had for the asking—but not the union shop which negates the individual rights of a worker.

So what's the strike about? You must come back to (1) monopoly and union power. If this is not what the union wants, why does it not strive for union security without the union shop? Industry offers are very fair. It already has collection of dues by the company and a very high membership percentage.

Tom Campbell

Editor

Sched. A to M-80

AUGUST 15, 1951

U. S. DEPARTMENT OF COMMERCE

NATIONAL PRODUCTION AUTHORITY

TITLE 32A—NATIONAL DEFENSE, APPENDIX

Chapter VI—National Production Authority, Department of Commerce

[NPA Order M-80, Schedule A]

M-80—IRON AND STEEL—ALLOYING MATERIALS AND ALLOY PRODUCTS

SCHEDULE A—NICKEL-BEARING STAINLESS STEEL, HIGH NICKEL ALLOY, AND NICKEL SILVER

...found necessary and ...ote the national de... ...pursuant to the au... ...101 of the Defense ...950, as amended. In ... NPA Order M-80, on ...ule is based, there has ...n with industry repre... ...uding trade association ..., and consideration has ... their recommendations. ... is issued under NPA Order ... made a part of that order. ...of NPA Order M-80 subjects ...ocation and prohibits the use ...n nickel-plating in the manu... ...d assembly of certain products.

...ons.

...s prohibited.

...ons.

...contained in that list under the subheading C–I. No person shall use any nickel silver, or any component parts made therefrom, in the production, manufacture, or assembly of any product other than those products contained in that list under subheading A–III, unless prohibited by subheading B–III. No person shall use nickel-bearing stainless steel, high nickel alloy, or nickel silver for decorative or ornamental purposes.

SEC. 3. *Exceptions.* (a) The prohibitions contained in section 2 of this schedule with respect to products included in subheading A–I and A–II of the list at the end of this schedule shall not apply to the use of nickel-bearing stainless steel, high nickel alloy, or nickel silver, or component parts made therefrom, to the extent that any such materials were contained in a person's inventory on March 1, 1951, or had been ordered by that person and such order had been accepted by the producer for February 1951 production and received by that person in his inventory prior to June 1, 1951. This exception is applicable only to the extent that such materials are wholly unsuitable for use in the production, manufacture, or assembly by such person of any product not included in subheading A–I and A–II of that list.

...ibitions contained in sec... ...chedule ...

(d) Any unassembled component parts, produced prior to the issuance of, or in conformity with, this schedule, of products subject to the provisions of section 2 may be sold any time, and the purchaser thereof may assemble such component parts into products subject to the prohibitions of section 2 of this schedule at any time, provided such component parts are wholly unsuitable for use in the production, manufacture, or assembly of any product not prohibited.

(e) Notwithstanding that a product may be contained in the list under the subheadings A–I, B–I, and C–I, the prohibition contained in section 2 of this schedule shall not apply if any such product is manufactured exclusively for use on board vessels and aircraft operated by the Armed Forces of the United States, including the United States Coast Guard.

SEC. 4. *Records.* Every person who relies on the provisions of paragraphs (a), (b), or (c) of section 3 of this schedule shall prepare a detailed record showing: (a) the quantities of nickel-bearing stainless steel, high nickel alloy, and nickel silver, or component parts made therefrom, which were in his inventory on the first days of each month commencing with December 1950, and ending September 15, 1951, which were wholly unsuitable for use by him in the

IF YOUR PRODUCTION IS THREATENED BY THE CRITICAL MATERIAL CONTROLS

Is your product on this long list prohibited from using critical materials such as nickel-bearing stainless steel? Are you having difficulty obtaining aluminum or copper?

If you are, it will pay you to get all the facts regarding Sharon '430' Stainless Steel. This straight chrome stainless is the best available material today for many applications and has been used by hundreds of fabricators for thousands of products with great success. It has many of the qualities that have made stainless steel the most sought after metal today.

Sharon '430' is readily available with few restrictions as to end use. The Sharon Steel Corporation has prepared a special booklet giving information on Sharon '430'. To get yours, contact the Sharon office nearest you or write direct to ***Department 4752 — Sharon Steel Corporation, Sharon, Pa.*** Engineering help and technical assistance, too, available without obligation.

SHARONSTEEL

...YOU CAN CONTINUE WITH

Sharon stainless 430

Dear Editor:

Letters from readers

Spark Testing

Sir:

Your past few letters published in the "Dear Editor" column could have given a more thorough knowledge of the art of spark testing.

One must primarily recognize spark testing as an art and as such the actual value of this spark testing is a function of one's natural ability to see, understand and apply simple fundamental principles. This final spark picture is merely a resultant of a physical teaming off of small metallic particles by a grinding wheel and the visual picture depicting chemical reactions, which based upon the chemical composition, may be simple or complex heterogeneous reactions.

Having trained over 50 employees during the past 4 years and observed their work, I feel it is a mistake to believe that one must be able to distinguish all colors, be very imaginative and to require a long training period. It is a fact that with proper individual cooperation an average young man just out of school may in 6 weeks' time be able to accomplish the following by spark testing without the use of standards:

(1) Judge carbon content:

±.02 up to .29c
±.03 .29c to .55c
±.05 .55c up

(2) Know the deoxidation practice used at the steelmaking furnace, i.e., killed, semikilled, capped, etc.

(3) Detect the presence of Mn, S, Ni, Cr and Mo.

I am working on a plan to produce colored movies of spark streams and to illustrate this art of spark testing into book form, shortly, in clear and simple terms which I feel certain will nullify most of the mysteries and confusion concerning its practical applications in industry today.

E. E. BISHOP
Metallurgical Engineer
Wyckoff Steel Co.
Ambridge, Pa.

Colorimetry

Sir:

Due to the pressure for speed in analytical work we are trying to change a number of our analytical procedures to colorimetry. A search of recent literature revealed to me a guide which I think would be helpful.

In your Apr. 28, 1949 issue appeared an article entitled "A Guide to Colorimetric Methods of Analysis." I wonder if I might obtain tear sheets of the article?

J. EKLEBERRY
Asst. Chief Chemist
Buick Motor Div.
General Motors Corp.
Flint, Mich.

Interest Runs High

Sir:

Will you please send us six reprints of the article "Shell Molded Stainless Valves and Fittings" by G. F. Sullivan, appearing on p. 112 of your June 26 issue.

R. F. GALVIN
President
Ohio Steel Foundry Co.
Lima, Ohio

Sir:

Kindly send me a tear sheet of the article "Shell Molded Stainless Valves and Fittings" by G. F. Sullivan which appeared in your June 26 issue.

J. A. KEARNEY
Chief Metallurgist
Crucible Steel Co. of America
Harrison, N. J.

Sir:

Kindly send me two reprints of your interesting article by G. F. Sullivan, managing editor, "Shell Molded Stainless Valves and Fittings," which was in your June 26 issue.

P. F. NYDEGGER
P. F. Nydegger
Westfield, N. J.

Gas Free Metals

Sir:

On the Newsfront page of your Apr. 24 issue there was an item on vacuum cast gas free metals which are now in commercial production.

Please advise where we might be able to find more information on this subject as several members of our research staff are interested.

L. LYONS
Western Cartridge Co.
East Alton, Ill.

Further information on vacuum cast gas free metals may be obtained from the National Research Corp., 70 Memorial Drive, Cambridge 42, Mass.—Ed.

Power Transmission

Sir:

Please let me have tear sheets of the series of articles on power transmission by John E. Hyler, which started in your Jan. 10 issue.

We found these articles highly interesting and would like to keep them on record.

A. H. BOEHM
Mechanical Engineer
Steel Co. of Canada, Ltd.
Montreal

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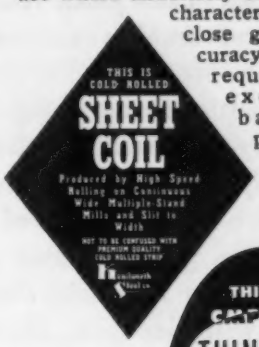

An economy material for simple forming operations and general use where uniformity of physical characteristics and close gauge accuracy are not required. An excellent base for paint and enamel.

For intricate fabricating operations where die life is an important factor of cost and all applications which demand precision and uniformity of gauge, chemistry and physical properties. Close gauge tolerances insure maximum "square footage" per ton.

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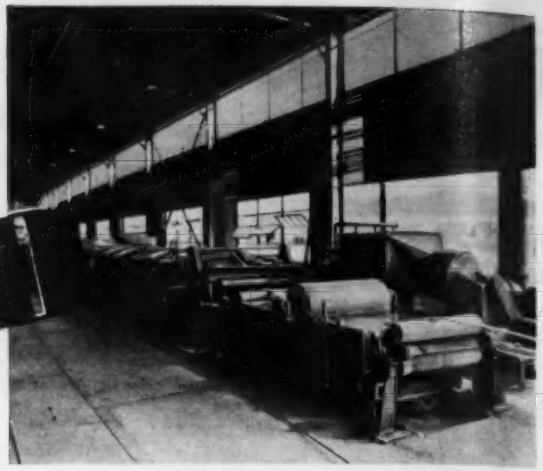
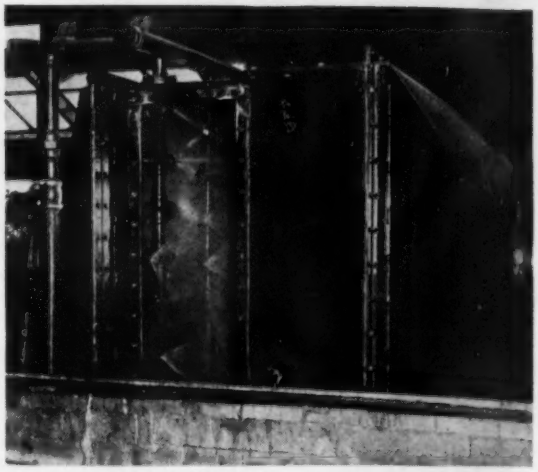
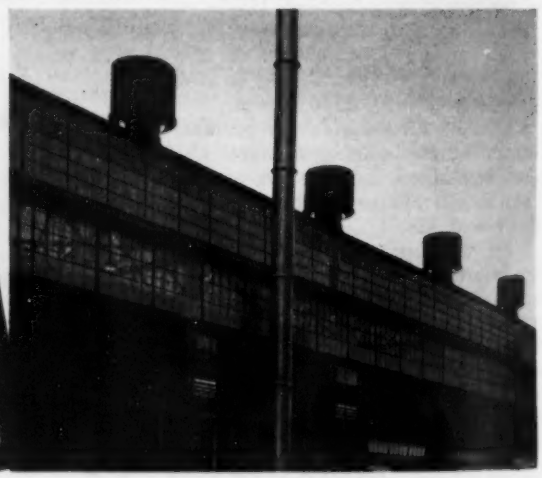


TANKS and COVERS



AIR WASHER REMOVING FUMES



EXTERIOR STACK and BREECHING

WHEREVER metal surfaces are exposed to corrosive acids in this pickle line—tanks and covers, fume duct and scrubber equipment, exterior stack—protection comes from PLIOWELD—Goodyear's *permanent* anticorrosion lining of rubber bonded to metal. Every PLIOWELD installation is formulated especially by the G.T.M.—Goodyear Technical Man—to meet the exact demands of the job. To get his assistance with your corrosion problems, see your nearest Goodyear Industrial Rubber Products Distributor, or write Goodyear, Akron 16, Ohio.

GOODYEAR INDUSTRIAL RUBBER PRODUCTS

GTM -Specified USES FOR PLIOWELD

PROCESSING TANKS—rectangular, round, square • TANK COVERS—flat, box, radius types • STORAGE TANKS—open top flat or dished heads • TRUNK TANKS • FLANGED PIPE • FLANGED PIPE FITTINGS • FANS—wheels and housings • DUCTWORK • SCRUBBERS—air purifiers • AGITATORS • CONTINUOUS VACUUM FILTERS • TROUGHS AND CHUTES • PUMPS • FILTER FRAMES • MOISTURE ELIMINATORS • MISCELLANEOUS FABRICATED ITEMS

PLIOWELD can also be used to combat abrasion

GOODYEAR

THE GREATEST NAME IN RUBBER

Plioweld—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Fatigue Cracks

by Charles T. Post

Again and Again

We can't give you the exact figure until it becomes official, but the latest calculation shows that more readers are renewing their subscriptions to you f.f.j. today than ever before in its 97-year history. The new record is well over four out of five, and it's reasonable to believe that death or taxes have done for the rest. We love our readers and it's nice to know that they love their f.f.j., too.

Choppers

The horizons of the metalworking industry are constantly broadening. Offhand you would name guided missiles or rocket ships as the latest advance into uncharted fields, but Tom Rohan, the West Coast editor, has uncovered a development that may affect the lives of more people.

"Magnetized Posterior Block Teeth" is the official name of mankind's latest boon. In case your dentist can't explain them, the dentures have magnetic metal inserts and rely on the principle of repulsion of similar poles to keep them snugly in place. Users are urged to remove them on retiring, however, because the repulsion is strong enough to open the mouth and cause snoring.

Our research staff has pointed out other possible complications. "Suppose," they warn, "that you carefully raise a knife-full of peas to your mouth. The knife gets within the magnetic field and is snapped inexorably towards the magnets. It would be not only embarrassing, but dangerous."

On the Nose

Alcoa's *Aluminum News-Letter*, quite naturally, is always quick to point out the strides being made by the light metal, which, to judge by an item in the last issue, has practically broken into a full gallop.

"About a year ago," the item stated, "we did a piece on aluminum's role in the animal kingdom. We bespoke the affinity of fauna for the light metal and wound up paying tribute to the many fleet-footed steeds who zip around the nation's race tracks in their aluminum shoes. Positively wouldn't be without 'em, said many of the derby circuit winners, unquote.

"Well, sir, recent results have proved us right beyond a doubt. Elsie Hix's syndicated 'Strange As It Seems' carried an illustrated item the other day that made us want to go right out to the nearest horse rink and shake Dobbin's hand . . . er, aluminum-plated hoof.

"According to the picture column, 88 per cent of the races at Belmont Park's fall meeting were handily copped by those enlightened horses wearing aluminum footwear in front! A performance like that, you see, is the sort of thing that prompts us to go out and get 'pally' with Dobbin!

"Now, we're not making book, but we *do* feel we know some of the prize makin's of a derby winner when we see it. Here's a tip that won't cost you a cent: next time they're parading the entries in the paddock, check your racing form, appraise the jockey, then ask Dobbin, pretty please, to show you his hoof! Here's two bucks (on the nose) for your trouble."

Puzzlers

No puzzle last week so naturally there is no answer this week.

Answers to the bee puzzle are still coming in from G. R. Langzettel, Bath Iron Works Corp.; W. F. LaVigne, Remington Rand Co.; B. F. Kuby, The Advertising Corp.; T. Emaus & F. Cook, Grand Rapids Metal Craft, and R. W. Shank, International Harvester Co.

The long division puzzler is still proving popular. Latest heard from are: C. Rahauser, A. Mabakowski Co.; S. T. Gadomski & F. D'Ambrose, U. S. Navy Metals Laboratory; C. A. Landusky, Norris-Thermador Corp.; A. Wolf, International Harvester Co.; F. Woodland, Jr., American Telephone & Telegraph Co.; R. E. Dennis, Jr., Vulcan Mfg. Div.; J. E. Kaltenbach, Springfield Body & Trailer Co.; S. L. Clope, Young Radiator Co.; H. Fishman, General Electric Co.; V. W. Russell, The Carborundum Co., and F. M. Peterson, Consolidated Vultee Aircraft Corp., are a little late with their answers to the bar puzzle.

C. B. Smith, Portland Copper & Tank Wks., thinks that this one will keep you occupied for a while. An isosceles triangle has a base of 4 in. and an altitude of 5 in. Its apex is rounded off to a full .250 in. radius and the base corners are rounded off to a full .375 in. radius. What is the diameter of a circle that will just enclose the figure?

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CHAINS AND SPROCKETS

The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

► Noble pledges of the steel union that defense steel would be shipped out of struck plants have in many cases been dishonored. Latest barrier to shipment is some unions demanding that oversized crews and various technicians handle small lots of steel. Finished steel which had not been inspected before the strike is staying put.

► Another application of shell molding is General Motors' casting transmission member of automatic transmission by using plaster core and a shell molded shell. Experimental torus members for transmissions have also been made. Shell mold casting a diesel cylinder liner uses 7.6 lb of metal—compared to 17 lb with former methods.

► Theoretically as much as 5 lb of metal can now be melted at one time with the levitation method (melting metals suspended in gas or vacuum by action of high frequency fields). Besides purifying high temperature metals, process has definite potential in sintering.

► In 1951 metalworking used about $6.5 million worth of removable rust preventives for temporary protection of products. This figure is seen as rising substantially this year. Protectors include oils and coatings, vapor paper wrappers, aluminum foil, etc.

► Studies of plastic prototype models of products ranging from machine tools to autos will probably result in changes of welding designs and practices. Plastic models give new planning insight.

► Washington may soon enter cryolite business. Under tentative plans a producer would supply the bauxite solvent to government which would act as distributing agent. Surplus would be stockpiled.

► Electric power from atomic reactors may be drawing closer. Monsanto Chemical Co., St. Louis, and an electric company have proposed to Atomic Energy Commission a dual purpose pilot plant to produce power, plutonium. Changes in Atomic Energy Act are on way but may not permit private ownership of atomic energy plants.

► Low-cost welded aluminum tubing 3/8 in. to 1 in. is being made in limited quantities. It may become competitive with seamless aluminum tubing in fields not calling for high pressure applications. Tubing is now being used for TV antennas, clothes dryer tubing, etc. A large market for the tubing may be in tubular furniture.

► Russell Mfg. Co., Middletown, Conn., has developed new way of making brake lining. Strands of asbestos web are saturated and surrounded with frictional binder material. Compression under 300 tons pressure creates density of 120 lb per cu ft. Results claimed: uniform lining structure, uniform wear, high tensile strength.

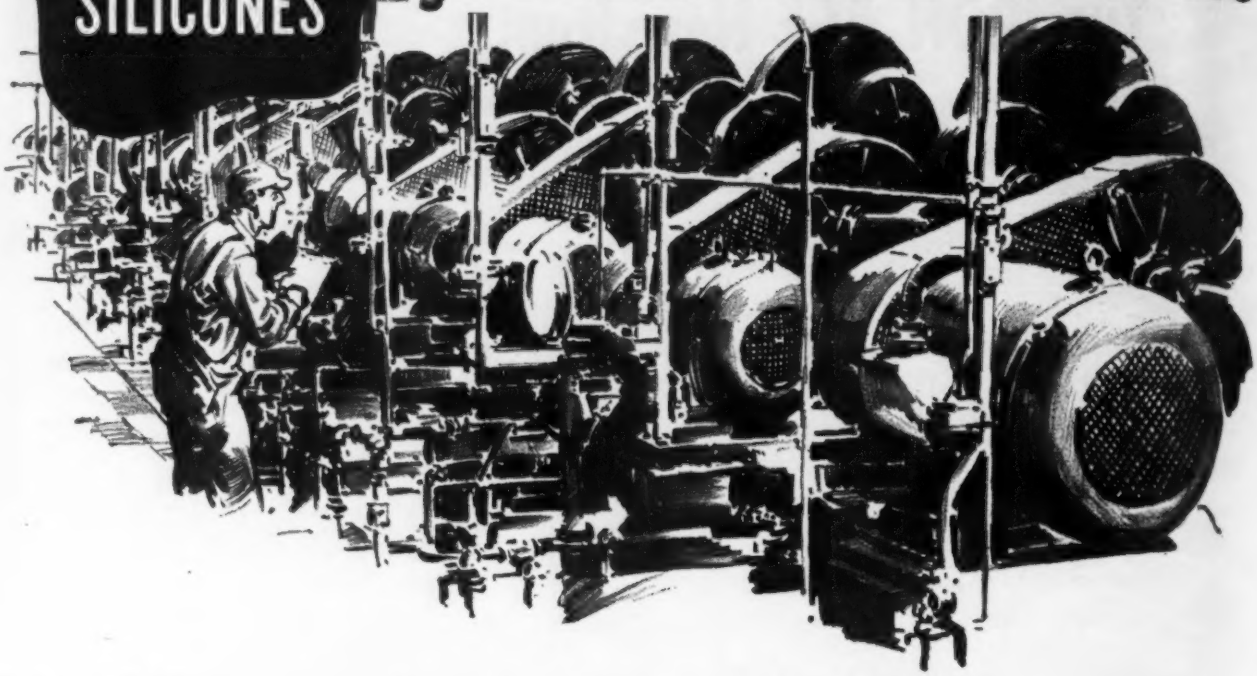
► The steel strike is slugging railroads hard. Pennsylvania Railroad estimates its June losses of revenue due to the strike as between $15 million to $17 million. First loss of shipping was in ore, coal, basic raw materials for steel. Now shutdowns of steel metalworking plants is digging more deeply into hauling.

► Conversion steel is being explored by at least one large appliance maker—after more than a year of utter disinterest.

► Maintenance in the strikebound steel industry is spotty. Some forward-looking union men are taking care of plants devotedly. Other locals are sullenly refusing to permit maintenance. This means neglected plants will take longer to enter full production.

► Metallurgists are seeking ways to beat the problem of turbine blade vibration. The problem will be far more serious when larger, faster turbines are developed. Wanted is a suitable metal.

DOW CORNING SILICONES give motors more muscles



Gained 30% more pumping capacity; saved about $50,000

Engineers of a leading chemical company had to increase pumping capacity in one production unit by 30%. They did so by having 31 motors with name plate ratings of 50 and 60 hp at 850 rpm, rewound with Class H insulation to put out 75 to 90 hp at 1150 rpm.

New 75 hp motors with conventional insulation plus installation would have cost $68,200. Rewinding, plus installation on the original mounts, cost about $19,000. That's an initial saving of almost $50,000.

Equally important has been the added life and reliability of these Class H motors. The old 50 and 60 hp motors burned out at the rate of one a month or 48 failures in 4 years. Rewound with Class H insulation, these same motors have been delivering at least 50% more power for the past 4 years with only 6 failures.

That's why more and more engineers and management men specify Class H insulation for hard working motors, for critical motors that determine productive capacity, and for motors subjected to high ambient temperatures and excessive moisture or corrosive chemicals.

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STEEL: Military Snatches What's Handy

Seize all they can lay hands on when non-struck plants open . . . CMP directives conflict, confuse . . . More trouble, delay for civilian users . . . Hustling will last—By J. B. Delaney.

Steel producers can look forward to no bed of roses when the strike ends. Neither can steel consumers.

The Army, Navy, Munitions Board, and Atomic Energy Commission have other plans.

Tip-off is the experience of steel companies which have settled with the union and resumed production. Workers were hardly back into the plants before the military and AEC moved in to grab off every pound of steel they could lay their hands on.

They Move In — One harassed producer was forced to provide office space for representatives of these agencies. CMP directives, which take precedence over all other orders, appeared out of nowhere, adding to the confusion and fouling up production schedules. Orders on the books of strike-bound plants were transferred to the operating companies. Government agencies vied with one another for the output of various mills.

The entire industry can look for a continuation of government hustling and confusion. It will linger for some time after the mills get back into production.

Reason for frantic haste by government procurement men is this: Before the strike, defense needs ran to 1 million tons of finished steel per month. Every week of the strike meant a loss to defense industries of approximately 250,000 finished tons. This loss must be made up—and the military and AEC want theirs ahead of other consuming industries.

Fair Weather Clients—The producing mills are whirling around in circles. They naturally want to accommodate their bread-and-butter commercial accounts. They have no desire to take on consumers who will fade away when supply becomes easier. They are under pressure from all sides—and the experience isn't exhilarating.

One producer reports he is required to send a letter of explanation to a government representative when he finds it impossible to handle a defense agency order.

Another had this unique problem: One agency directed him to deliver in one month 15,000 tons of shell quality steel from a mill with a capacity of 16,000 tons. This was tough, but barely possible.

What snarled up the situation inextricably, though, was the demand of another agency for 6000 tons of tube rounds off the same mill during the same period. The producer threw up his hands and flew to Washington.

From All Sides—A third mill was slapped simultaneously with four directives on four different orders for AEC. He couldn't take the orders. This is the reason: He couldn't get enough nickel for alloying purposes.

Meanwhile, struck plants continue to receive their regular nickel allotments, which stand unused in railroad cars and collecting depots. This mill could produce 30 pct more of a critical item if the nickel were made available.

The mills fear directives more than anything else. These directives come suddenly, mean that even other defense orders must be shoved back on the schedule to make room. They make it difficult—almost impossible — to maintain an orderly production schedule. They mean extra paper work, possible loss of production, trouble for non-defense steel consumers.

STRIKE: Security But No Union Shop

Settlement should come in middle ground between union shop and union security . . . Terms of industry offer rejected by Murray . . . Talk turkey on iron ore contract—By J. B. Delaney.

In the middle ground between outright union shop so insistently sought by the United Steel Workers of America and the ironclad union security offered by the steel industry lay room for settlement of the steel strike.

Both factions almost met in that margin of possible compromise last week when the union almost accepted a union security offer. Talks resumed on Tuesday.

Almost irresistible pressures of union men going hungry and of manufacturers fighting complete shutdown with their backs against the wall were driving both sides to settlement. About 18 million tons of steel was certain to be lost even if the strike were settled this week.

This is the industry proposal on union security rejected by Philip Murray, USW chief, even after two of his top lieutenants urged that it be accepted:

What Was Offered—New employees would be required to sign an application for union membership. But unlike the so-called Bethlehem arrangement offered tentatively to the union, the application would remain with the company and not the union. Between the worker's 15th and 30th day of employment, he would be free to cancel his application.

The steel industry reneged against transmitting applications to the union because of the fear that union pressure would prevent a worker from exercising freedom of choice. The industry has fought bitterly against surrendering.

This was union security that was unbreachable.

At the request of Presidential assistant Dr. John Steelman another critical meeting got underway last Tuesday in Pittsburgh between the union and Bethlehem Steel Corp. negotiators, acting as spokesmen for the steel industry.

Plans Cancelled—Mr. Murray's original plan to call a meeting of his wage policy committee and international executive committee was seen as shelved. Continuation of the Pittsburgh talks at the instigation of Dr. Steelman altered his plan. It also did away with the need for Washington steel talks that had been planned.

The industry offer was evidence of its genuine wish to meet the union more than half way. But the stand against dictatorial union powers evolving through compulsory union membership could not be yielded. The worker would have the full power to decide for himself without being swayed by the union.

If he did not choose to escape his application within the set time, the application would be sent to the union and membership would be accomplished fact. If the employee decided he wanted no part of the union, his decision to withdraw his application would be strictly between the man and the company.

Iron Ore Talk—Although overshadowed by union security wrangling, the work stoppage in the iron ore fields came in for considerable discussion last week. Talks centered largely on technical aspects of the iron ore contract in the hope of reaching agreement before Wage Stabilization Board hands down its recommendation.

The ore contract could prove to be another roadblock to strike settlement. Simultaneous agreement to both ore and union security issues is sought by the USW. By hinging the ore contract to the terrible urgency of the steel strike, the union may be figuring to work the situation to its advantage.

Meanwhile, steel producers saw the navigation season on the Great Lakes being frittered away unfruitfully. Iron ore losses for winter stockpiles were staggering. It will mean severe ore shortages that may shut down some mills next winter.

Scars Will Show—Goading the industry and union to intensified efforts to settle were drastic economic repercussions of the strike. About 1.5 million steelworkers and manufacturing employees are unemployed because of it. It will take months before the country recovers from the shutdown—and scars will remain.

Steel prices are not a genuine stumbling block to settlement. In the first place it was evident that the industry was willing to go almost whole hog in granting union economic demands. The package offered would cost the industry 24.6¢ an hr for each worker. Washington will now approve a price increase of $5 or more per ton but less than $5.50. But it must be remembered that the industry went on record with its generous wage offer before these price increases were definitely approved.

Pay Hike Prevents Jet Strike

A strike at North American's Ohio and California plane plants making F-86 Sabre jets has been averted as a result of agreement on basic pay and letting federal mediation settle the dispute.

OIL: Fall Short of New Well Goal

May drill 45,000 instead of revised 50,000-well target . . . PAD calls for 5000-well-per-year increment . . . Steel expansion in oil areas will aid supply—By K. W. Bennett.

In the opening months of '52 Department of the Interior announced that it wanted 85,000 oil wells drilled in the next 18 months. A few months later, Petroleum Administration for Defense readjusted its sights, spoke of 50,000 wells this year.

Without a strike, pipe producers were putting out steel at a goodly clip, drillers were hitting a rate that might have produced 50,000 wells this year. A few weeks ago, PAD made a third recommendation—that 50,000 wells be drilled this year, with an increment increase of 5000 wells per year through 1955.

Nonetheless, veteran oil men eyed the steel available and predicted a 45,000-well year in '52. Even that would require straining. Only 44,516 wells were completed in 1951—which had been the previous record year. With the advent of the steel strike, of course, oil country goods and line pipe took a severe drubbing as did every other purchaser of steel who'd planned to expand his output in the waning months of 1952.

Will Fall Short—Present indications are that, despite wishful thinking from Washington, crossing the 50,000 well mark this year is out the window.

On the credit side of the ledger:

Expansion plans by Lone Star Steel will boost oil country pipe capacity by 500,000 tons. Not only that, but the completed pipe will be in the heart of oil country, with short freight hauls to prospective drillers in that area.

In Ohio, another major producer plans to expand its output by an annual 180,000 tons of 2⅜ in. through 9⅝ in. tubing, material that will aid the oil well operators.

In Colorado, a pipe mill handling the same general sizes will come in with an estimated capacity of 150,000 tons each year.

Get Foreign Pipe—Also working to their advantage is the procurement experience oil country people have gained during the post war boom. While other steel consumers let go of their foreign sources and got out from under expensive conversion deals in a weakening steel market a few months ago, oil people kept right on striving for all the extra steel they could get.

NO SEAMS: Red hot billet is pierced at seamless pipe mill in the Gary Plant of U. S. Steel's National Tube Div.

In view of the strike and the tightening steel market this proved a very wise decision. Some pipe is being picked up in Europe, especially Germany. And it seems unlikely that conversion deals will be upset by the government which had been trying to help sponsor them. At least one large new conversion arrangement involving cross-country hauling of electric furnace ingots and conversion into tube rounds and finally drill pipe is in the making now.

And on the debit side:

Most pipe and tube producers were booked into '53 when the strike came. Fabricators of larger sizes have remained in action during the strike, but have dug deeply into their stockpiles of plate. Their return to full scale production will require time.

Needs Mounting—With pipeline and tube steel already a premium, gas and pipeline owners have launched a program that will achieve full pitch in '53. It will mean a record expansion, and the bulk of this is scheduled for transmission facilities, meaning more use of tube and pipeline, which will certainly affect the amount of material available for drilling.

Average well drilled in '53, '54, and '55 will require increasing quantities of casing, if present trends continue. In 1947, average footage per well was 3443. This figure jumped to 3680 in 1950. In 1951 it rose again to 3871. Trend has been continuous and is expected to stay that way.

Similarly, despite the constant betterment of oil production technology, there has been a slight but perceptible rise in the number of dry wells drilled each year.

British Deal—Included in the steel-for-Britain program is a quantity of tube rounds, which will be converted into seamless tubing of oil country grade. Subsequent events make Mr. Churchill's quick bargain look better and better—for him.

If 55,000 wells remains the PAD target for '53, they will have trouble attaining that figure unless some way is found to do the job with less oil country goods.

And whatever happens, an additional 5000 wells per year is a rather high figure. Only once in the last 6 years has the national total of oil wells drilled topped the previous year's figure by 5000.

CANNING: Another Strike Victim

Perishable food packing season nearing peak . . . Weirton operating only tinplate line . . . Shortage could reach grocers' in late fall . . . NPA told Weirton to make only canning plate.

Will empty shelves at the corner grocer's be the next effect of the steel strike? It could be. The cutoff of tinplate production is a grave threat to food canning. Dept. of Agriculture and National Production Authority realize the danger and are doing the little that can be done to forestall the emergency.

A prompt end of the strike would largely solve the problem. Its continuation will make the worst fears come true.

Reason for alarm is that perishable food packing season is approaching its peak. The can companies do not have sufficient inventories to meet requirements for long. It is estimated that production of Weirton Steel Co., the only tinplate mill not affected by the strike, plus can company inventories, plus stock in warehouses are enough for only one-third of needs.

Stocks Vary—No definite deadline can be established by which time the steel strike must be settled if a shortage of perishable foods is to be averted. Inventories of different can companies vary as do stocks in their individual plants. These firms can make no definite predictions on how soon they will run out of tinplate.

Another important variable is the weather. If perishable crops ripen quickly the tinplate shortage will become critical that much sooner. A rough guess as to when canned perishable foods may be in short supply if the strike does not end soon is October or November.

Continental Can Co., one of the largest producers in the country, told THE IRON AGE its tinplate inventory could provide definite protection to only those crops canned in July. What happens after that the company is not sure. Another large can concern said it had made exceptionally good preparations for the summer even before the strike so it was probably in a little better shape.

NPA Action—First step taken by NPA to meet the possible crisis was to direct Weirton Steel Co. to divert all of its tinplate production into canner-quality stock during July, August and September. Can companies receiving shipments from Weirton must certify that they will use the tinplate for perishable food canning only.

As a result, if the strike continues first layoffs in the canning industry will be in plants making containers for non-food products such as tobacco, coffee, oil, etc. They are not entitled to receive tinplate from Weirton and as a result will be operating strictly from inventories now on hand.

NPA's second step to ease the shortage was to ask the striking United Steelworkers of America for cooperation in removing finished tinplate from closed mills and warehouses. This request had the approval of Dr. John Steelman, mobilization director. If the union would go along, some 100,000 tons of tinplate could be moved to can companies, estimates NPA.

The union was not expected to receive the request with any real enthusiasm. Even the movement of steel for defense has been spotty, has led to company-union quarrels over use of non-union men on these assignments.

300,000 Tons Waiting — NPA also estimates that another 300,000 tons of tinplate is in the production pipelines in the mills, could be finished reasonably soon should the strike be settled.

The mills have also been asked to make an inventory of so-called mill accumulations—tinplate of odd sizes and coating. Some of this could be used in a pinch for perishable food packing.

In another direction, NPA has directed struck mills to give it an estimate of how much more tinplate could be produced at the expense of other mill production. (Sheets, for example.)

Hold Exports—The crisis may also have its effect on European requirements. We have been shipping approximately 120,000 tons of prime plate to foreign markets each quarter. In addition, considerable tonnage of secondary plate has gone overseas.

It is understood NPA has withheld export quotas for the third quarter pending outcome of the strike. If the situation worsens, this plate could be diverted to the domestic market. Office of International Trade and State Dept. probably would protest.

SHIPMENTS OF TIN & TERNEPLATE 1946-51

NET TONS

Year	Tin & Terneplate hot dipped	Tinplate electrolytic
1951	1,628,562	2,887,129
1950	1,911,568	2,840,599
1949	1,699,355	1,993,468
1948	2,167,912	1,784,288
1947	2,093,149	1,617,659
1946	1,924,657	909,173

STEEL: How Much Strike Damage?

Openhearth refractories will be biggest obstacle to full output when strike ends . . . Full extent of roof damage won't show up until later . . . Blast furnaces in better shape.

Damaged openhearth refractories will be the biggest single cause of delay in restoring steel plants to full production. Full extent of damage will not be known until the furnaces are in operation.

Problem will vary from plant to plant. To some mills openhearths will be a major headache. A lot will depend on condition of the furnace when the strike was called. An openhearth that was nearing the end of its normal campaign would suffer more than one that had just been rebuilt.

Steel producers are less concerned about blast furnaces, coke ovens, and heating furnaces, although one operator fears damage to several blast furnaces.

Two Weeks—Estimates on when the industry could return to normal after the strike ends vary. Best figure is approximately 30 days. Most mills expect to reach full output in 2 weeks or less.

New steel would be tapped 3 to 4 days after the strike ends. First casts of iron from blast furnaces could be made in about 3 days, although these initial tappings will be too high in silicon—3.5 to 4.0 pct—to be used as hot metal. They will be pigged and used later in "homeopathic doses." Blast furnace operators aim for a silicon content of 0.90 to 1.25 pct.

Delay will be encountered at the soaking pits. Some mills will overload the pits to get enough ingots up to temperature for rolling.

An undetermined tonnage of finished steel marooned when the strike started would be shipped as soon as freight cars are available.

Worry Over Openhearths—Producers don't know for sure what to expect from the opennearths. They can count the openhearth roofs that have caved in due to the low maintenance temperature. But they expect more trouble later, when the furnaces are brought up to melting temperature. Many roofs that look good have actually been weakened by contraction, and will collapse in production.

Coke—Coke ovens were maintained at about 25 pct of normal. Gas produced by ovens that were charged and pushed was used to keep heat on idle ovens.

In most instances the union provided maintenance men to keep mills in shape. Where such agreements could not be reached, supervisors took over the job. In the initial phase of the strike, supervisors at several companies were forced to remain inside the plants. Later, arrangements were made to permit them to pass picket lines.

Union maintenance work was limited to bare essentials—such as checking temperatures and sealing leaks in shutdown blast furnaces.

By-Products

Steel Shutdown Hurts Chemical Industry

Courtesy U. S. Steel Co.

Generally overlooked is the fact that a steel strike is a threat to the chemical industry.

A long list of chemicals and pharmaceuticals depend on continued operation of coke ovens for their base materials. Since the steel strike began coke oven production fell to 20 pct of normal, largely from smaller mills and ovens operated by public utilities.

Dependent on coke oven by-products are such products as the sulfa drugs, waterproof clothing, plastics, insecticides, synthetic rubber, fertilizers, paints, varnishes and enamels.

A strike of 2 months or more would hit the chemical industry hard. Most chemical plants were carrying 2-month inventories when the walkout began. They saw it coming and stocked up from domestic and European sources. At best, Europe can meet only 20-25 pct of requirements.

In short supply when the mills shut down were sulfate of ammonia needed for production of fertilizers, and pyradene, which is a base for sulfa drugs.

MORALE: Reds Brag They're Stronger

Say they can turn more steel to direct war uses than America . . . Forget production miracle of World War II—performed by U. S. . . . Say we are slaves to supplying civilian economy.

The Reds are flexing their production biceps and sneering at the war-effectiveness of America's immense productive plant. They are trying to reinforce their own morale and impress any Communist-dominated European official who has to listen.

Medium for the sneak propaganda attack is a booklet issued by Gen. Vesolvod N. Merkulov, Minister of State Control. The Reds are arguing that they can turn more steel to war despite the fact that they made but 34 million tons last year to America's 107 million.

They say demands of the American civilian economy *must* be appeased, requiring huge amounts of steel. On the other hand, Russia can ignore its civilian economy and divert almost all its steel to mayhem and warfare.

One-Handed Battle — American steelmaking and productive plant would be in the position of a big man facing a smaller man. But the bigger man would have one hand tied behind his back.

The Reds claim they can do things America would not dare. They can slash output of tin cans, refrigerators, motor cars, kitchen utensils, and hundreds of other consumer goods without blinking an eyelash. For America to do so would be to imperil its entire economic structure.

Stand on the Record—This line of logic forgets that a smaller American productive machine spewed out war goods in tonnages never dreamt of before to win World War II. And it was the Russians who had to implore us for supplies to keep their armies functioning.

Russia is still untested against truly heavy industry. It would have fallen against Germany if Western powers had not interceded—and Germany did not have one-fifth of the steel capacity that the U. S. now owns.

As for imperiling the economy by concentration of too much production on war, America bent every effort to winning World War II. Its industry emerged stronger and greatly expanded. The Reds do not reckon with America's economic stamina.

More "facts" in the booklet relate how Russia would invest but 1 million tons of steel for ship construction—and nothing for naval vessels except for small amounts to build submarines. Russia is uninterested in battleships or aircraft carriers. But when carrier-based planes deposit a few A-bombs on Moscow—if war comes—the Reds will know that this American steel was not misused.

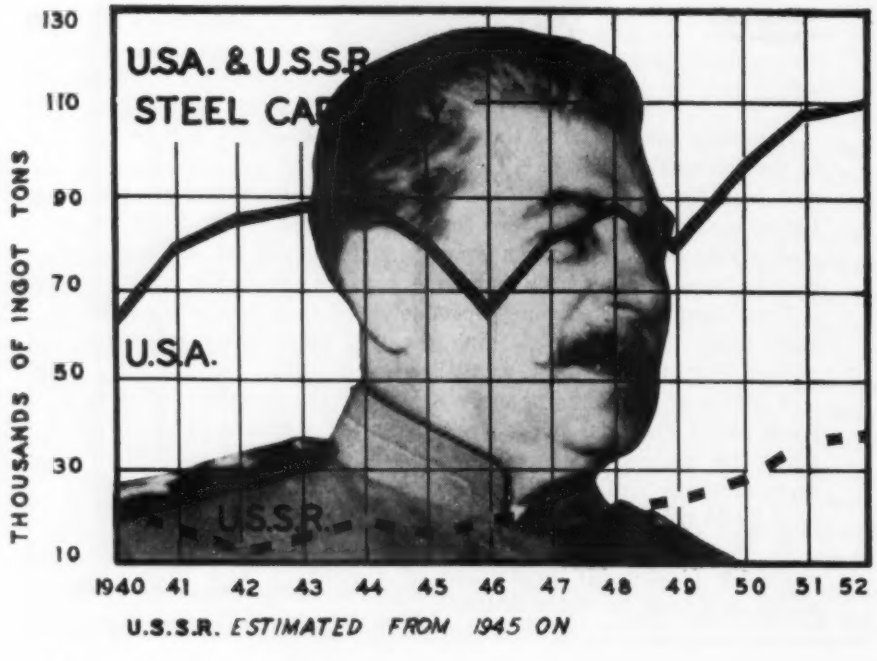
Russia thumps its chest boastfully that the American army must have 400 supply soldiers supporting 100 front line men. Russia needs but 70 rearguard troops for 100 on the front.

This amounts to a great burden of supply for the rearguard divisions. But the Reds don't remember that American supply lines mean high morale and effectiveness. An army with terrific firepower per front line soldier must of necessity have a large supply organization. Besides, if necessity arises, rearguard men become front line men.

Pampered — American soldiers, are lavishly supplied with barracks, knick-knacks, Post Exchanges, food, etc., the Reds reason. The Red soldier gets less to eat and has few niceties squandered on him. (He hasn't been used to them and perhaps never will be.)

When the booklet boiled down all its facts, the Reds had more steel to turn to war than America. They also claimed that the Austrian steel industry would be making steel for Russia. The West German, Benelux, and French steel plants would be quickly overrun. Satellite countries would naturally continue producing steel for Russian armaments.

One thing is certain: Stretching out of America's rearmament timetable has injected new confidence into the Reds. They see us as slaves to our civilian economy.



Idled Iron Ore Mines Waste Away

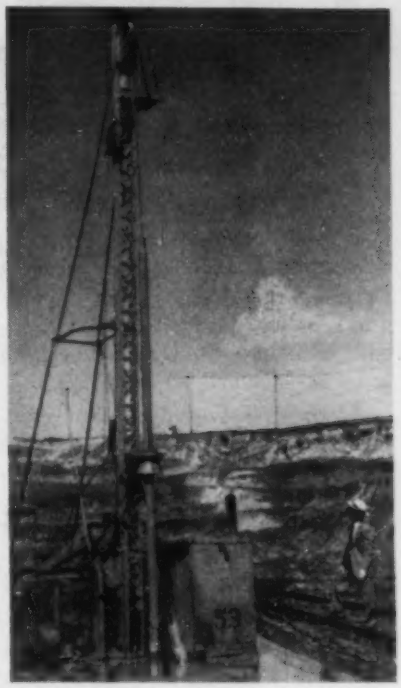
Iron ore mines made unproductive by sympathy-striking miners can swiftly go to pot unless nursed along by full maintenance. From the Mesabi Range, supplier of most of the ore American steel mills use, came warnings that slim maintenance crews could not cope with the deterioration of idleness.

Personal inspection of mines in the Duluth-Hibbing area by an IRON AGE editor indicated that mines were not getting all upkeep needed. A major company said that in one group of its mines 35 maintenance men were trying to do the work of a normal 250. A check of mines in the Hibbing-Chisholm area disclosed that water was causing grave damage.

Considering bad condition of mines, a mine manager estimated his post-strike loading schedule would be as follows:

An ore trickle would leave mines 4 hours after the strike. Eight hours would see ore shipped to docks. But the company would not be able to load more than a single boat at Duluth until more than 24 hours later.

In the second 24 hours, perhaps 60,000 to 100,000 tons would leave these mines. About eight boats would be loaded. The company may be able to load 18 ore boats a day (near capacity) in the third 24 hours. It will take from 3 days to 1 week for mills to receive first shipments of ore.



NEGLECTED: Water damage to a drilling rig in the Duluth-Hibbing area is examined by IRON AGE Editor Keith W. Bennett.

WASHOUT: Railroad tracking near an open mine is made useless by washout on two benches. Trench in foreground developed on either side of a 20 in. drainage pipe.

NO POWER: Circuit boxes of this electric power shovel were ruined by water damage.

NOT ENOUGH: Coal and limestone have been coming into Duluth since the steel strike started. But surplus ore boats are harbored throughout the Great Lakes, some with loads still in their holds. At least 24 hr would be needed to reload ships with ore after the strike ends.

METALS: You'll Be Getting More

Aluminum, copper stocks improve . . . Both dropped from "most critical" category . . . Stockpiling to start again in fourth quarter . . . Non-defense quotas raised—By *A. K. Rannells.*

Aluminum and copper supplies have improved sufficiently to permit removal from the "most critical" category. Stockpiling of both is to be resumed.

A progressive decontrol program is on the way. Tip-off was the removal of end use restrictions of aluminum foil, to be followed by decontrol of powder and paste. Removal of end use limitations on copper is being "considered."

Repayment of copper withdrawn from the national stockpile is to start during the fourth quarter. Resumption of aluminum stockpiling is slated for the same period.

Raise Quotas—With steel output down to less than 15 pct of capacity, control officials have raised fourth quarter aluminum allocations for non-defense purposes generally to about 55 pct of base levels. Copper allocations will be at about 50 pct.

"Although consumers who also require steel will still be handicapped," a top official said, "they will nevertheless have an opportunity to restore inventory balances."

Fourth quarter aluminum programming is based on an expected supply of at least 731 million lb. Officials believe this estimate is conservative, since it includes an allowance for possible loss through a low water power supply.

More Setasides — This amount has permitted increased setasides of aluminum for claimant agencies for the fourth quarter. Boost is about 27 million lb, including 10 million for hardship reserves.

It also paves the way for resumption of aluminum stockpiling in "a modest way" not later than the fourth quarter to replace withdrawals late in 1951 and early 1952.

Same Object — This action has not been without opposition. Some segments of the fabricating industry believe that resumption of stockpiling should be delayed until aluminum allocations get back somewhere near the 85 pct level.

As an alternative, it has been suggested that if aluminum stockpiling is to be resumed, such metal should be of a higher iron content—subject to replacement, of course, by better quality later when production matches all requirements.

It is felt by mobilization officials that replenishment of the stockpile "has been delayed too long" as it is. Deputy DPA Administrator Sam Anderson says a start must be made this fall.

Present plans are to divert 31 million lb of fourth quarter production for stockpiling. And if the seasonal loss from low water power fails to occur this year, it is likely that this windfall will also be stockpiled.

Industry Controls This Week

Aircraft Steel—Dir. 1, Sched. 1, curbs shipments of aircraft steel from warehouses and other distributors.

Aluminum Foil—Revocation of M-67 removes all end-use restrictions on aluminum foil.

Electrical Equipment—Dir. 1, M-44 establishes policy under which manufacturer's delivery dates of major electrical equipment will not be rescheduled.

Refractories—Amend. 9, CPR 67 switches prices of resold refractory products from GCPR to CRP 67.

Steel—Amend. 4, CPR 98 allows sale at warehouse prices of steel products in transit when the strike began. Dir. 5, NPA Reg. 2 permits postponement of specified delivery dates if they cannot be met because of the strike. CPR 156 prescribes a method of determining ceiling process for fabricators and erectors of structural iron and steel products.

STEEL: Strike Cuts Output of Ingots, Castings

As Reported to the American Iron & Steel Institute

	Openhearth		Bessemer		Electric		Total		Calculated Net Tons	No. Weeks in
1951	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Weekly	Month
January	7,846,657	101.4	431,725	90.4	570,084	88.8	8,848,466	99.9	1,997,396	4.43
February	6,936,993	99.3	326,112	75.6	507,302	87.5	7,770,407	97.2	1,942,602	4.00
March	8,061,348	104.2	408,926	85.6	606,358	94.5	9,076,630	102.5	2,048,901	4.43
1st Quarter	22,844,998	101.7	1,166,763	84.2	1,683,744	90.4	25,695,503	100.0	1,998,095	12.86
April	7,958,839	104.9	392,472	84.9	594,668	95.7	8,845,979	103.1	2,062,000	4.29
May	8,072,994	104.4	408,650	85.6	618,511	96.4	9,100,155	102.8	2,054,211	4.43
June	7,669,449	102.4	403,001	87.1	589,898	94.9	8,662,348	101.0	2,019,195	4.29
2nd Quarter	23,601,282	103.9	1,204,123	85.9	1,803,077	95.7	26,608,482	102.3	2,045,233	13.01
1st 6 months	46,446,278	102.8	2,370,886	85.0	3,486,821	93.0	52,303,985	101.1	2,021,801	25.87
July	7,706,078	99.8	411,599	86.4	566,818	88.5	8,684,495	98.3	1,984,818	4.42
August	7,694,965	99.5	436,622	91.5	607,308	94.6	8,739,095	98.7	1,972,708	4.43
September	7,653,801	102.4	404,726	87.7	601,830	97.0	8,660,357	101.2	2,023,448	4.29
3rd Quarter	23,054,844	100.5	1,253,147	88.5	1,775,956	93.4	26,083,947	99.4	1,986,592	13.13
9 months	69,501,122	102.0	3,624,033	86.2	5,262,777	93.1	78,387,932	100.5	2,009,947	39.00
October	8,028,721	103.8	458,128	95.9	635,037	98.9	9,121,886	103.0	2,088,116	4.43
November	7,750,845	103.5	411,954	89.1	636,553	102.4	8,799,352	102.6	2,051,131	4.29
December	7,885,830	102.2	396,831	83.3	608,017	94.9	8,890,678	100.8	2,011,488	4.42
4th Quarter	23,665,396	103.1	1,266,913	89.4	1,879,607	98.7	26,811,916	102.1	2,040,481	13.14
2nd 6 months	46,720,240	101.8	2,520,060	89.0	3,655,563	96.0	52,695,863	100.7	2,013,548	26.27
Total	93,166,518	102.3	4,890,946	87.0	7,142,384	94.5	105,199,848	100.9	2,017,642	52.14
1952										
January	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
February	7,703,068	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,091,114	4.14
March	8,401,140	104.4	378,861	83.1	624,190	89.5	9,404,191	102.2	2,122,842	4.43
1st Quarter	24,207,329	102.5	1,168,871	87.4	1,821,318	89.0	27,197,518	100.7	2,092,117	13.00
April	7,101,199	91.1	323,006	73.2	566,937	83.9	7,991,142	89.7	1,862,737	4.29
May[1,2]	7,287,000	90.5	318,000	69.7	596,000	85.4	8,201,000	89.1	1,851,000	4.43
June[2]	(a)	.....	(a)	.....	(a)	.....	1,639,000	18.4	3,820,000	4.29
2nd Quarter[2]	.....	.....	.....	.....	.....	.....	17,831,142	66.0	1,370,572	13.01
1st 6 months[2]	.....	.....	.....	.....	.....	.....	45,028,660	83.3	1,731,206	26.01

Note—Percentages of capacity operated in 1951 are calculated on weekly capacities of 1,746,337 net tons openhearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951 as follows: Openhearth 91,054,020 net tons, bessemer 5,621,000 net tons, electric 7,554,630 net tons, total 104,229,650 net tons. Percentages for 1952 are calculated on weekly capacities of 1,816,637 net tons openhearth 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952 as follows: Openhearth 94,973,780 net tons, bessemer 5,361,000 net tons, electric 8,232,890 net tons, total 108,587,670 net tons.

[1] Revised. [2] Preliminary figures, subject to revision. (a) Not available.

Structurals Price Order Issued

Fabricators and erectors of structural iron and steel products, government price-setters say, will get about the same dollar profit they realized during the pre-December, 1950, base period by applying Ceiling Price Reg. 156 to the items they handle.

This new order, which became effective July 15, was written for fabricators of structural steel, miscellaneous and ornamental iron, and vessel shop products for field assembly or emplacement. Before issuance of CPR 156, the industry group affected had the option of determining prices under either General Ceiling Price Reg. or CPR 30.

CPR 156 provides that a fabricator or erector will compute ceilings by estimating his products costs, based on prices and rates in effect when he submitted his bid on the job, and adding 9/10 of the percentage markup he received for a comparable product between July 1, 1950, and Mar. 31, 1951.

An appendix to CPR 156 lists in detail those items covered. In general, they are custom-engineered and custom - fabricated products fabricated chiefly from ferrous and nonferrous structural shapes, plates, bars, sheets, pipe-mill products and tubing.

Building Okayed If Steel on Hand

New construction projects may be started where the applicant has enough carbon steel on hand—in his actual possession or inventory—to complete the job.

This new ruling, made to ease the impact of the steel stoppage, applies to all types of building except for recreational, amusement and entertainment purposes.

On application, National Production Authority and its claimant agencies will give permission on proper showing and will also make allocations of copper and aluminum within existing regulations.

Steel held by another for the owner's account will not be considered as a basis for granting permission to start work.

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AlSiMag Strainer Cores are made in many shapes and sizes. They fit in the gate of your mold and strain the incoming metal. Foundries using them report substantial reduction in rejects and improvement in smoothness and uniformity of castings. They are easier to handle—speed production. Store practically any place.

FREE SAMPLES of sizes in stock will be sent free on request. Samples specially made to your own specifications at moderate cost. Try them in your own foundry and see for yourself how AlSiMag Strainer Cores will save you money.

NEW PRICES

Demand for AlSiMag Strainer Cores far exceeded our highest estimates. New high production machinery now permits us to meet any reasonable delivery date.

WRITE for new quotations specifying size, type and quantity desired. Each item has been refigured on basis of improved production methods.

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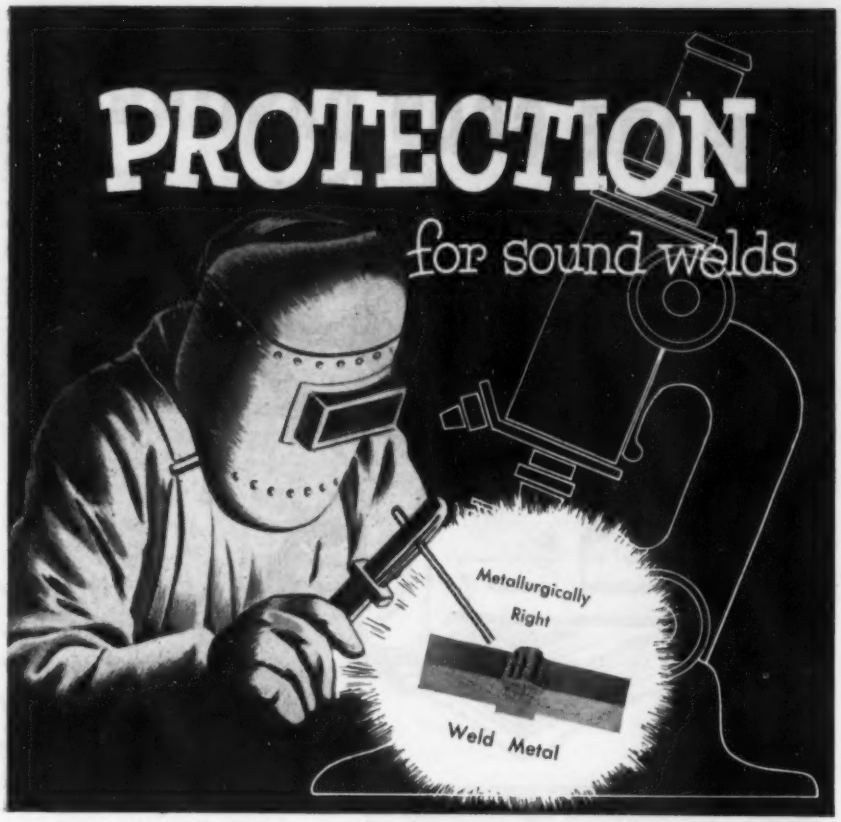

Use ARCOS "Quality Controlled" Stainless Electrodes

In the split-second flash of an arc, Arcos stainless electrodes produce the "right" weld metal for the job at hand. This is the result of Arcos' experience with fabricators' welding problems . . . competent research in the behavior of various grades of electrodes in use and weld metal in service . . . a strict application of quality control in manufacture.

The value of any electrode lies in the quality of the weld metal it produces. And that's where Arcos strives to build the values that count . . . soundness, specific mechanical or corrosion resistant properties, or microstructures that can stand-up to destructive service conditions. ARCOS CORPORATION, 1500 South 50th St., Philadelphia 43, Penna.

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Specialists in Stainless, Low Hydrogen and Non-Ferrous Electrodes

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Frequency meter, 634 ea, $176,089, International Television Corp., New York.

Chamber assy, 331 ea, $87,462, Skyway Precision Tool Co., Alhambra, Calif.

Tensiometer, $39,768, Pacific Scientific Co., Los Angeles.

Bushing, nipple, elbow, 60450 ea, $32,209, Aircraft Hardware Mfg. Co., Inc., New York.

Floor polishing machinery, 500 ea, $64,775, Lincoln-Schlueter Floor Mach. Co., Chicago.

Aircraft bolts, 182100 ea, $63,297, Aircraft Hardware Mfg Co., Inc., New York.

Stand, assy, 64 ea, $76,096, American Saw Mill Mach. Co., Hackettstown, N. J.

Screw, 9878000 ea, $31,802, Stronghold Screw Prods., Inc., Chicago.

Roller conveyors, 32793 ea, $836,274, Rapids Std. Co., Inc., Grand Rapids.

Planishing irons, 180 ea, $35,820, Watervliet Tool Co., Albany.

Blast cabinet, 48 ea, $73,680, Vapor Blast Mfg. Co., Milwaukee.

Stabilizer covers, $47,188, Camel Mfg. Co., Knoxville, Tenn.

Wright engine parts, $58,803, Franklin Steel Co., Los Angeles.

Pump assy, $46,583, Gadgets, Inc., Dayton.

Sawing machines, 24 ea, $60,292, Armstrong-Blum Mfg. Co., Chicago.

Punch turret, 6 ea, $56,746, Wiedemann Machine Co., Philadelphia.

Pins, 13560000 ea, $34,171, American Steel Co., Pittsburgh.

Ladder assy, 2478 ea, $35,144, Ypsilanti Mach. & Tool Co., Ypsilanti, Mich.

Starter, generators, 191 ea, $231,280, General Electric Co., Schenectady.

Spare parts, $153,788, Bendix-Westinghouse Auto Air Brake Co., Elyria, Ohio.

Engine assy, 150 ea, $67,455, Waukesha Motors Corp., Waukesha, Wis.

Spare parts, $64,401, Bendix Aviation Corp., Teterboro, N. J., *F. A. Battell.*

Spare parts, $139,558, Jack & Heintz, Inc., Cleveland.

Dynamometer, 13 ea, $43,216, Clayton Mfg. Co., El Monte, Calif.

Spare parts, $101,062, The Thew Shovel Co., Elyria, Ohio.

Heaters & spare parts, 57 ea, $39,516, Herman Nelison Amer. Air Filter Co., Inc., Moline, Ill.

Spare parts, $30,382, Garwood Industries, Inc., Wayne, Mich.

Wheel assys, 282 ea, $36,648, The Goodyear Tire & Rubber Co., Inc., Akron, *H. A. Delaney.*

Wheel assys, 281 ea, $46,738, The B. F. Goodrich Co., Dayton.

Electrical starters, 335 ea, $100,211, Bendix Aviation Corp., Teterboro, N. J.

Self lock nuts, $210,175, Elastic Stop Nut Corp. of America, Union, N. J.

Engines and spare parts, 300 ea, $3,000,000, GMC, Indianapolis, *H. S. Bowden.*

Heaters and spare parts, $1,076,026, Herman-Nelison Amer. Filter Co., Moline, Ill.

Components of automatic pilot, $468,973, Bendix Aviation Corp., Teterboro, N. J.

Mobile training unit, $75,000, Piasecki Helicopter Corp., Morton, Pa.

Hydrant valve, 200 ea, $30,130, Buckeye Iron & Brass Wks., Dayton.

Grinders, 79 ea, $307,629, The C. H. Gosiger Machinery Co., Dayton.

Circuit breakers, $208,043, Mechanical Prod., Inc., Jackson, Mich.

Exciter control relays, 487 ea, $40,017, Standard Electrical Prod. Co., Dayton.

Spare parts, $73,135, Michigan Power Shovel Co., Benton Harbor, Mich.

Fuze, grenade, 2345000 ea, $924,656, Bayshore Industries, Inc., Elkton, Md.

Mine, anti-personnel, 407000 ea, $907,610, Lehigh Foundries, Inc., Easton, Pa.

Primer, percussion, 20000 uts of 100 ea, $179,640, Ocean City Mfg. Co., Phila.

Breech ring forgings for 105MM howitzer, 668 ea, $313,960, Standard Steel Works, Burnham, Pa.

Shell, 105MM, M60, 500000, $3,440,000, Kohler Co., Kohler, Wis.

Primer percussion, 1680000, $193,200, Langson Mfg. Co., Chicago, Ill.

155MM How, $761,434, Minneapolis Moline Co., Minneapolis.

Primer, percussion, 900000, $211,500, Langson Mfg. Co., Chicago.

Fuze, PD, M48A3, 26400, $5,516,742, Stewart Warner Corp., Chicago, *E. N. Osterberg.*
Container, metal ammunition, 2500000, $224,850, American Can Co., Chicago.
Drum, metal, 100000, $394,400, Rheem Mfg. Co., Chicago, *W. H. Roy.*
Bushing, connector, $25,069, Callens Engineering Co., Culver City, Calif.
Fuze, PD, M48A3, 12350, $2,346,500, Rubon Co., Chicago.

Navy Small Business Awards Grow

Navy prime contract awards to small business firms in the first 11 months of fiscal 1952 were valued at $1,949,000,000.

Based on total procurement amounting to more than $8 billion, small companies received about 23.9 pct, the Navy said. This percentage is well ahead of the 18.4 pct of all military prime contract dollars which a congressional group said small business got in the first 9 months of fiscal 1952.

According to Navy figures, small firms obtained 18.8 pct of the department's awards in the first 11 months of fiscal 1951.

Landing Craft Contracts Awarded

Contracts for construction of 431 landing craft for an estimated $35 million have been awarded by the Navy Dept. for use by the Army's Transportation Corps.

Three firms share the awards. Higgins, Inc., New Orleans, will build 322 craft, and American Pipe & Construction Co., Portland, will construct 99. The remaining ten will be built by Olson Shipyard, Inc., Chicago.

The mechanized water craft will be 70 ft long, have a beam of 21 ft. and a displacement of 68 tons.

"When you get time, of course."

Use ARCOS Low Hydrogen Electrodes

ARCOS GRADE	A.W.S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9016
Manganend 2M	E10016
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

When you can deposit sound weld metal without changing electrodes to meet different welding positions—and use the same electrode on A-C or D-C current—you're saving time and inconvenience. With few exceptions, all types of Arcos Low Hydrogen Electrodes offer this advantage on a variety of base metals. That means a smaller inventory, since you can safely weld many jobs from start to finish with ONE ELECTRODE. Because Arcos Low Hydrogen Electrodes are "quality controlled," there's no danger of underbead cracking.
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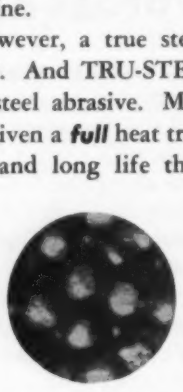
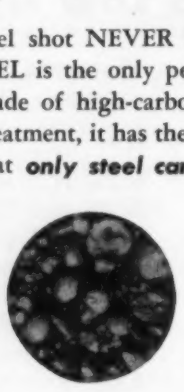
THE SHOT THAT NEVER SHATTERS

When blast cleaning abrasive starts to crumble, it loses its cleaning efficiency. Although the life of some iron abrasives has been prolonged by annealing and drawing, they still break down into the millions of sharp pieces that abrade the wearable parts of your cleaning machine.

However, a true steel shot NEVER SHATTERS. And TRU-STEEL is the only perfected true steel abrasive. Made of high-carbon steel and given a ***full*** heat treatment, it has the endurance and long life that ***only steel can give.***

TRU-STEEL after 1500 passes





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When you use TRU-STEEL, you save on abrasive costs, you save on maintenance material, you save on maintenance labor. How TRU-STEEL makes these savings is described in a new booklet which analyzes the cleaning dollar. Until you've tried TRU-STEEL, you can't be sure the abrasive you are using is giving you maximum life at lowest cost.

Send for your free copy of Bulletin 59-A today.

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510 S. Byrkit St., Mishawaka, Indiana

OPS Staff Facing Reduction

Some 6150 employees in Office of Price Stabilization national and field offices soon will get their notices of dismissal, effective Sept. 1, as the agency prepares to bring expenses down within the scope of tightened appropriations.

About 700 of the Washington staff of 2500 will have to go, while field offices will take a much more drastic cut from 9500 to about 4050. Regional and district offices established in the same cities will be combined to aid in this personnel reduction.

Cities where this merging procedure will occur are Boston, New York, Philadelphia, Richmond, Atlanta, Cleveland, Chicago, Minneapolis, Kansas City, Dallas, Denver, San Francisco, and Seattle.

At headquarters in Washington, there will be a combining of divisions and branches as the agency pulls in its belt.

Castor, Tung Oil Exports Set

Allocations have been made for the export of 100,000 lb of commercial and sulphonated castor oil and 90,000 lb of tung oil for the third quarter 1952.

These are the same quantities allocated for the second quarter. After review of the defense program, it was decided to continue controls indefinitely.

"Nobody could tell me I couldn't use the steel in my own warehouse."

Steel Export Licenses Extended

All export licenses expiring on and after June 2 have been automatically extended for 90 days after the end of the steel strike.

This action applies to licenses for all steel products coded STEE and TNPL on the positive list—whether or not the exporter's source of supply is directly affected by the strike.

It thus makes sure that steel products already scheduled for export p r o d u c t i o n will not be dropped from production schedules of struck mills.

Further action will be taken at the end of the strike, such as setting a new termination date after taking into account the impact of the strike on the availability of steel supplies.

Strike No Ban to Warehouse Fees

Warehousing outlets of a number of major steel producers are affected by a recent government order authorizing customary warehouse price charges, even though the steel strike has prevented performance of complete warehousing services.

Amend. 4, Ceiling Price Reg. 98, effective July 9, allows sale at the warehouse price of steel products in transit when the strike began and now stalled in railroad yards. This action, the government says, will not affect the level of steel products ceiling prices.

Delivery Dates Remain Unchanged

National Production Authority has established a policy under which it will not reschedule manufacturers' delivery dates of varied major electrical equipment except in defense emergency.

Under Dir. 1 to M-44, normal lead times for the affected items are listed. Order stipulates that rescheduling is out except under specific conditions.

In working out the direction to the order, no account was taken of manufacturers' backlogs, only the actual manufacturing cycle.

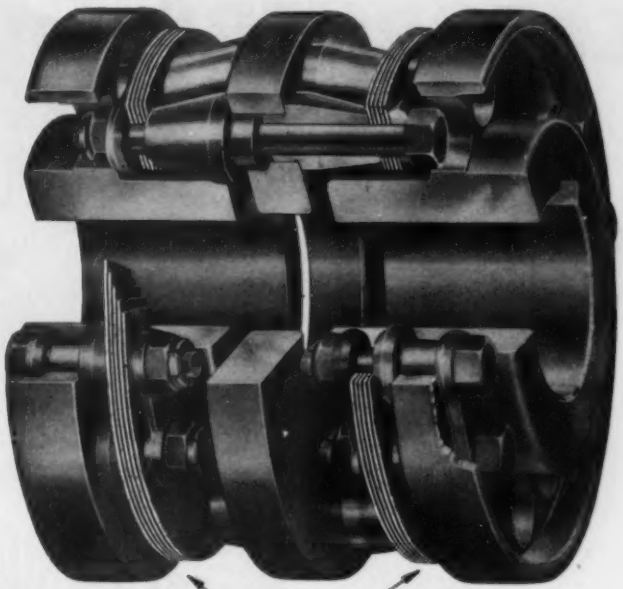
THOMAS *Flexible* ALL METAL COUPLINGS

FOR POWER TRANSMISSION • REQUIRE NO MAINTENANCE

Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

Thomas Couplings have a wide range of speeds, horsepower and shaft sizes: ½ to 40,000 HP — 1 to 30,000 RPM.

Specialists on Couplings for more than 30 years



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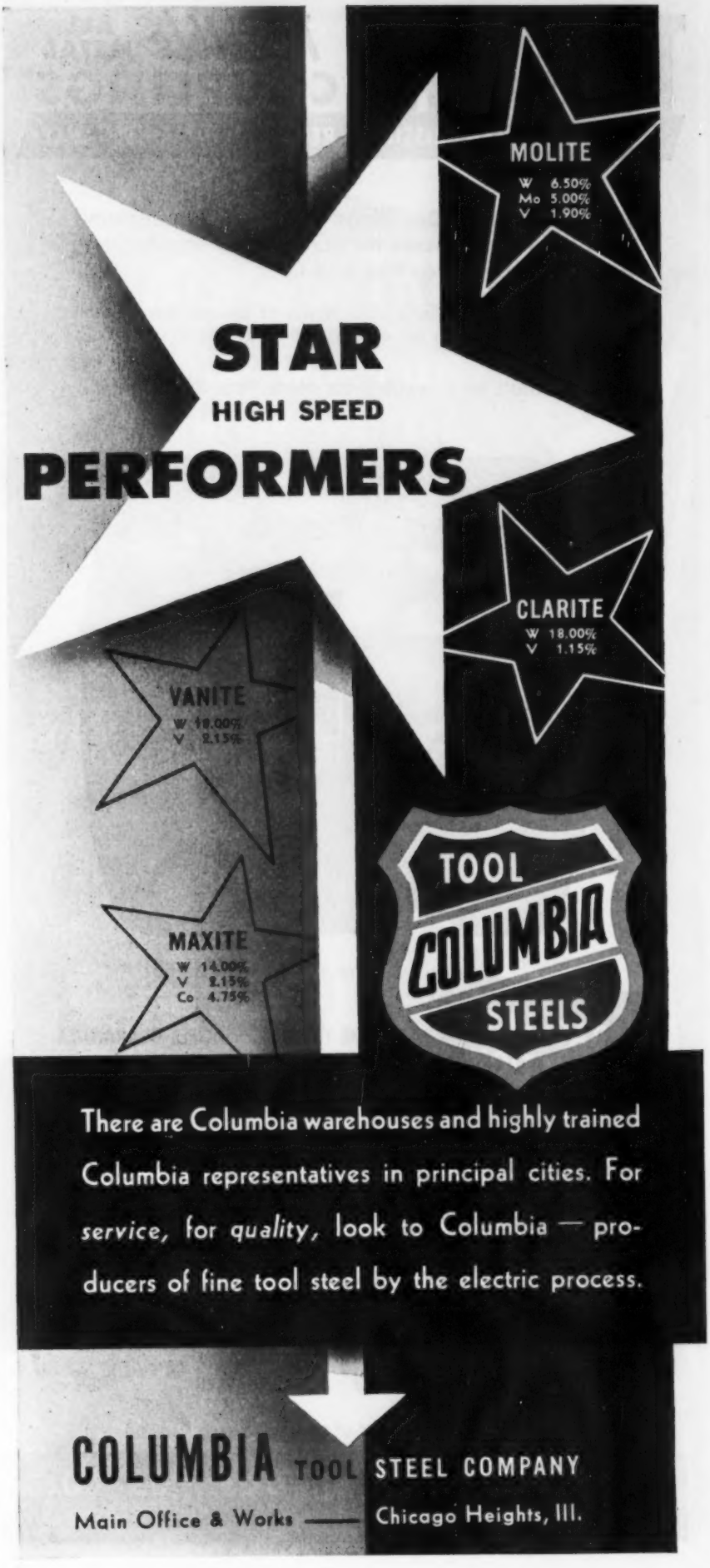
ALL PARTS ARE SOLIDLY BOLTED TOGETHER.

Write for the latest reprint of our Engineering Catalog.

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA



—Controls—

Refractories Switched to CPR 67

Resellers of refractory products now are pricing under Ceiling Price Reg. 67, which also applies to resellers of machinery and related manufactured goods.

Pricing practices for both groups are similar, Office of Price Stabilization said, making it appropriate to include both within coverage of CPR 67. This order provides a method whereby resellers may adjust ceilings automatically to reflect cost changes in items they sell.

Amend. 9, CPR 67, effective July 14, authorized the switch of sellers of refractory products from coverage by General Ceiling Price Reg. to CPR 67.

Strike Postpones Delivery Dates

Steel mills which hold individual directives from National Production Authority will be permitted to postpone the specified delivery dates if such cannot be met on account of the steel strike.

A new order, Dir. 5 to NPA Reg. 2, requires rescheduling of operations so as to assure delivery on all orders covered by NPA directives in the sequence originally established before the strike emergency.

As soon as producers are able to determine the rescheduled dates, customers must be notified with carbons to be forwarded promptly to NPA.

"Quit trying to land all your accounts on the golf course—Get back to the office for a rest occasionally."

New Aluminum Mill Planned

A new 144-in. 4-high hot and cold reversing mill for rolling tapered aluminum sheet and plate will be installed at the Davenport, Iowa, works of Aluminum Co. of America. The mill costs about $4.5 million and Alcoa will add $1 million for supplementary equipment and installations. Late 1953 should see the completion of the Air Force contract for installation.

This mill will roll widths up to 10 ft and lengths over 33 ft of tapered sheet and plate for aircraft wing skins. Present limits are slightly over 5½ ft and 25 ft, respectively. Advantage of the larger-size weight-saving sheet is in reduced assembly time and labor.

Westinghouse Leases Navy Plant

As part of a $32 million expansion program, Westinghouse Electric Corp. is reoccupying under lease agreement the Navy-owned Merchant Marine plant adjacent to its South Philadelphia Works. Included in the project are additions to existing buildings, extensive purchases of new machine tools and establishment of a $6 million steam and gas-turbine research laboratory.

The reactivated facilities in which Westinghouse produced steam turbines and gears for merchant ships in World War II will be used to manufacture marine propulsion units, electric utility turbines and gas turbines. It is expected that the expansion will create new jobs for 2200 people.

Grant Electric Power Loan

A loan of $19.6 million for expansion of electric power for uranium plant operation in South Africa has been made by the Export-Import Bank.

A previous loan of $35 million was granted by the bank to finance construction of uranium separation plants in connection with South African gold mines.

The present loan is needed, the bank said, to expand power generation facilities since the present power supply is too low to take on the additional load from the mines.

Two hoists connected with an American Mono-Tractor make up the special carrier for finger-tip transfer of heavy load.

Carrier runs on shielded RailMaster track over loading dock.

From warehouse stock to delivery truck, heavy loads are quickly transferred by finger-tip control with this American MonoRail Overhead Handling System.

In addition to speeding up loading and unloading time, this simple inexpensive system cut handling labor, improved space utilization, reduced material damage, and bettered working conditions.

It can be done in your plant and an American MonoRail engineer will gladly tell you how.

THE AMERICAN MONORAIL COMPANY

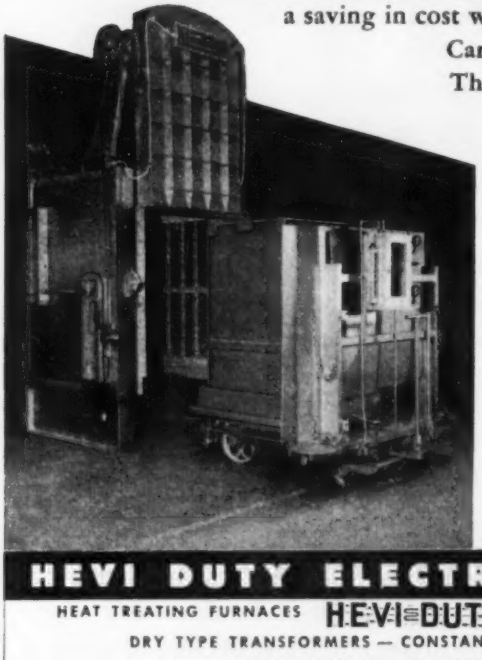
13103 ATHENS AVENUE • CLEVELAND 7, OHIO

FOR INCREASED PRODUCTION OF NITRIDED PARTS USE A

HEVI DUTY CAR BOTTOM NITRIDING FURNACE

Manufacturers producing nitrided parts for aircraft, engines, and heavy machinery items have found that more production is possible at a saving in cost when they use the Hevi Duty Car Bottom Nitriding Furnace. The furnace car, complete with sealed retort and ammonia dissociation equipment can be removed from the furnace for cooling and a second car with a cold load can be inserted immediately for a minimum loss of time between heats.

Write for Bulletin HD-664



HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

MILWAUKEE 1, WISCONSIN

—Financial—

Oil, Gas Get Most Write-off Aid

Oil and gas expansion are among the top-ranking projects benefiting from the government's accelerated amortization policy, according to Interior Dept. statistics.

Through May 30, a Petroleum Administration for Defense summary shows, Defense Production Administration had issued certificates of necessity for tax write-offs for $2.3 billion of the cost of 792 projects.

At the same time, DPA was still considering additional projects approved by DMPA which would authorize fast amortization for $96 million of the cost of 59 others.

Also as of May 30, PAD had denied 194 applications and still had 233 applications on hand for screening.

On a cost basis, the refining end of the industry received the most help—fast write-offs being approved for $998 million of the cost of 227 separate projects.

On a numerical basis, some 245 storage and transportation projects had been granted certificates covering $536 million of the total cost. Approved sulfur production expansion included 31 projects, permitting write-off of nearly $22 million of the cost, and estimated to increase production by 428,000 long tons annually.

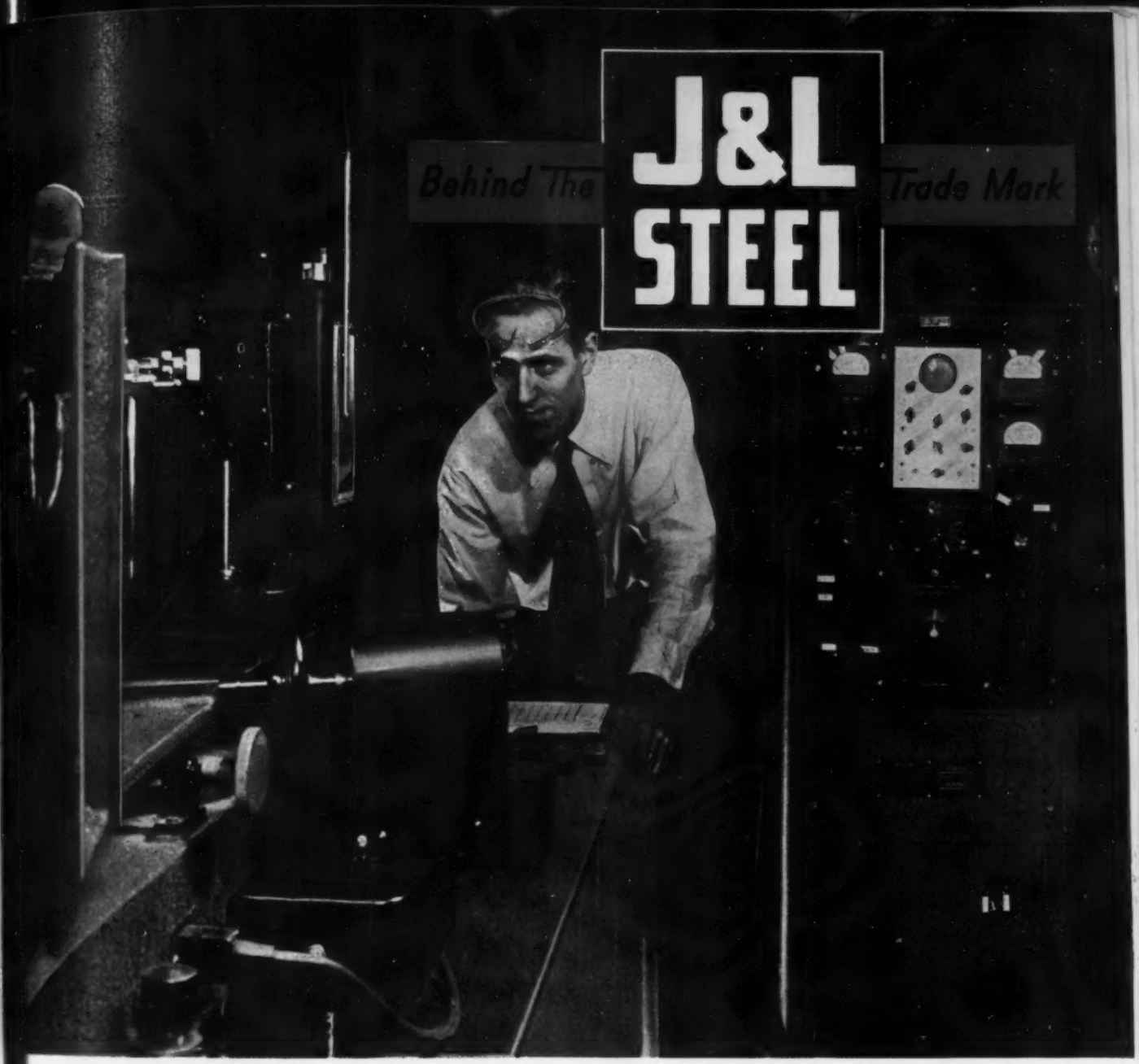
Increases in capacities in major fields under the accelerated amortization approvals were estimated at:

Refining, 1,278,000 bbl per day, and storage, 32 million bbl of crude and 2 million bbl of gasoline.

Renegotiation Totals Predicted

Filings for the first year of operation under the Renegotiation Act of 1951 will total about 27,000 cases, Renegotiation Board Chairman John T. Koehler predicts.

Approximately 15,000 of these cases will involve renegotiable sales of not more than $250,000, the statutory minimum, Mr. Koehler says. Of that portion of the remainder which will go to field boards for handling, Chicago will get some 22 pct, New York and Washington 18 pct each, Detroit and Los Angeles 16 pct each, and Boston 10 pct.



How "Excited Atoms" Insure Correct Steel Analysis

HERE'S the quick, modern way J&L chemists make sure eel contains the exact amounts of certain elements specified the customer's order.

First, a polished sample of the steel being analyzed is ced in this electronic apparatus called a "spectrograph." e sample acts as an electrode and creates an arc. The oms are excited by the arc and throw off a beam of light. The light rays, passing through a prism, are separated o various wave lengths and are photographed as separate e lines on film.

Each element appears on the developed film in its own characteristic density of line. Another instrument, the "densitometer," measures the line density, which the chemist quickly calculates into percentage.

The spectrograph analysis, done in a few minutes, assures the customer that his steel is made to the analysis he specified.

It's just one of the many functions of Jones & Laughlin Steel Corporation quality control, going on constantly behind the J&L trademark, to insure the quality of steel in better products for you.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

Industrial Briefs

Store Opened—NATIONAL SUPPLY CO., opened an oil and gas well supply store at Renovo, Pa., to serve gas well drillers and producers in the Renovo and Leidy Fields, Clinton County.

Licensed Affiliate — Strong, Narovec & Co., management consultants, Cleveland, have become a licensed affiliate of EDDY-RUCKER-NICKELS CO., Cambridge, Mass.

New Building — RUST ENGINEERING CO., has completed a new pattern shop and locker room building for the Shenango-Penn Mold Co., at Neville Island, Pa.

Military Jeeps—WILLYS-OVERLAND MOTORS, INC., has a $27 million order from the U. S. Ordnance Corp. for military Jeeps. All Jeeps to be built under this latest order will be the new streamlined model.

New Warehouse — HUBBELL METALS, INC., Kansas City, has completed a new modern warehouse at 801 Atlantic Ave., North Kansas City, to replace their present buildings.

Moves Branch Office — LATROBE STEEL CO., has moved its Detroit branch office and warehouse to a new location at 26355 Mound Rd., Center Line, Mich.

Loan Arrangements — ALLIS-CHALMERS MFG. CO., Milwaukee, has completed arrangements with a group of insurance companies for a loan aggregating $75 million.

New Factory—J. J. TOUREK MFG. CO., has completed its move into its new $650 thousand factory building at 1901 South Kilbourne Ave., Chicago.

Plant Expansion—TURNER BROS. INC., 2625 Hilton Rd., Ferndale, Mich., has completed a new plant addition that doubles its production capacity.

New Record — Crude STEEL PRODUCTION in Europe (not counting that of the Soviet Union) established a new record during the first quarter of this year. During the first quarter of 1952 European crude steel production was at an annual rate of 72,892,000 metric tons.

New Plant—Ground was broken recently for a new plant that will manufacture oil well drilling equipment for the petroleum industry by CHICAGO PNEUMATIC TOOL CO., at Fort Worth, Tex.

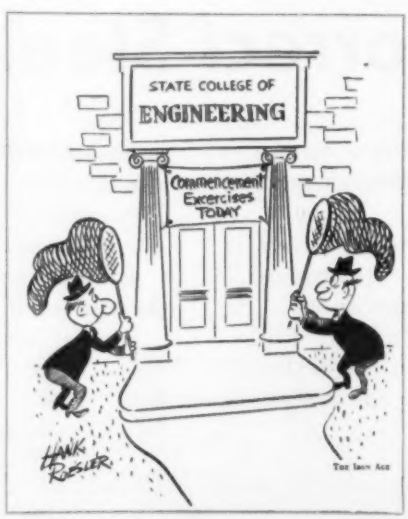
Production Started — Production of ferrosilicon was started recently in two of the five electric arc furnaces in the new, unfinished, $8 million alloy-producing plant of VANADIUM CORP. OF AMERICA, at Graham, Mason County, W. Va.

Steel Silo Facilities—New steel silo storage facilities, recently were completed for indoor stockpiling of chrome ore at the Baltimore Works, GENERAL REFRACTORIES CO.

Plant Opens—The new $750 thousand plant of PRECISION TOOL & DIE CO., LTD., Tel Aviv, Israel, established by the Bulova Foundation of New York, will begin operations this month. Arrangements have been made to accept qualified students of local schools as apprentices in the new plant.

Division Moved—Industrial Hydraulics Div. of CESSNA AIRCRAFT CO., has moved to its new plant at Hutchinson, Kan.

Unloading Docks—Contracting Div., DRAVO CORP., has been awarded a contract for construction of a new oil unloading dock on the Ohio River at South Point, Ohio, by Nitrogen Div. of Allied Chemical & Dye Corp.



Named Chairman — Dr. Eric A. Walker, dean of the School of Engineering, Pennsylvania State College, State College, Pa., was named chairman of the Engineering College Research Council and a vice-president of the AMERICAN SOCIETY FOR ENGINEERING EDUCATION.

New Plant—FRANKLIN ELECTRIC CO., INC., has added 48,000 sq ft of production area with the completion of a new plant last month. All offices are located in the new building at 458 E. Spring St., Bluffton, Ind.

75th Anniversary—JEFFREY MFG. CO., Columbus, Ohio, commemorated its 75th Anniversary with an Open House recently for employees, their families and guests.

New Offices—TOCCO Div. of Ohio Crankshaft Co., Cleveland, has opened a West Coast office at 3349 Union Pacific Ave., Los Angeles. Harlan A. Messner will be manager of the new offices.

Subsidiary Formed—A wholly-owned subsidiary corporation named Clevite Service, Inc., with headquarters at 6545 Carnegie Ave., Cleveland, has been formed by THE CLEVELAND GRAPHITE BRONZE CO., to take over the business of its Replacement Sales Div.

Representative — E. C. Sanders has become sales representative in Roanoke, Va., for THE HILL-CHASE STEEL CO. of Maryland.

Lively Interest—With an enrollment of about 180, there is lively interest in the resumption of the SALES CONFERENCE at Cornell University, to be directed by the National Machine Tool Builders' Assn. and the American Machine Tool Distributors' Assn. at Ithaca from July 28 through Aug. 1.

Contract—A contract for a complete iron-ore handling plant of over $2,800,000 has been confirmed between General Electric Co., Ltd., of England and Invest Import, Belgrade.

Vanadium-Alloys

says to today's tool steel users:

Buy by Brand*

—and get the *plus* in distinctive tool steel performance *built-in* by our exclusive methods of manufacture

The performance story of a specific tool steel is not revealed wholly by chemical analysis—it is a blending of machinability, toughness, strength, ability to resist wear, and other properties affecting die and tool life. Vanadium-Alloys' complete specialization in tool steel production, exclusive manufacturing methods, and everlasting "concentration upon perfection" make each brand name significant of *more than the formula—more for you*, by every performance yardstick. Buy by brand, buy Vanadium-Alloys, and be served best on every tool steel application.

Vanadium-Alloys Die Steels for *Hot work*

- **Hotform**—The original 5% Chromium Hot Work Die Steel. Select this grade for superior strength and toughness with high resistance to heat checking. Outstanding on aluminum die casting dies, shear blades, forging dies, mandrels, and tools for extrusion of brass and aluminum.
- **Choice**—High Carbon-Chromium Type Hot Work Die Steel with good wear resisting qualities. Recommended for gripper dies, upsetting dies, and hot headers.
- **Marvel**—10% Tungsten Hot Work Die Steel for tools requiring better resistance to high temperatures. Excellent for punches, nut piercers and dies, and brass forging dies.
- **Hotpress**—Tungsten Die Steel with additional toughness for high temperature work. Outstanding on dummy blocks for brass extrusion, upsetting dies, extrusion dies, and press dies.
- **Forge Die**—14% Tungsten Hot Work Steel, having high resistance to softening at elevated temperatures. Recommended for piercers, punches, and hot forming dies.
- **SC Special**—14% Tungsten Die Steel with increased carbon for better wearing properties. Particularly for extrusion punches, piercers, and forming dies.
- **WW Hotwork**—High Alloy Steel developed for maximum wear resistance at elevated temperatures. Used for copper and brass extruding dies, brass die casting dies, piercers for copper tubing, and nozzles on zinc die casting machines.
- **Red Cut Superior J Temper**—Tungsten High Speed Die Steel for high temperature service, having excellent hot hardness properties and wear resistance. Outstanding on extrusion dies, hot press dies, trimming dies, and punches.

Vanadium-Alloys

STEEL COMPANY

LATROBE, PA.

COLONIAL STEEL DIVISION • ANCHOR DRAWN STEEL COMPANY

Assembly Lines Run Out of Steel

Auto plants close as parts give out . . . Pipelines completely empty . . . Months needed to refill them after strike ends . . . Many defense plants still operating—By *R. D. Raddant.*

One by one the plants closed. Some reopened on a limited basis and others kept up employee hopes by calling it vacation or inventory time. But to all intents and purposes the automobile industry was down and down flat.

General Motors kept some of its many activities moving and Ford hoped to operate part time. Chrysler called it quits July 14 and shut down all car operations including military trucks. Independents were in the same condition.

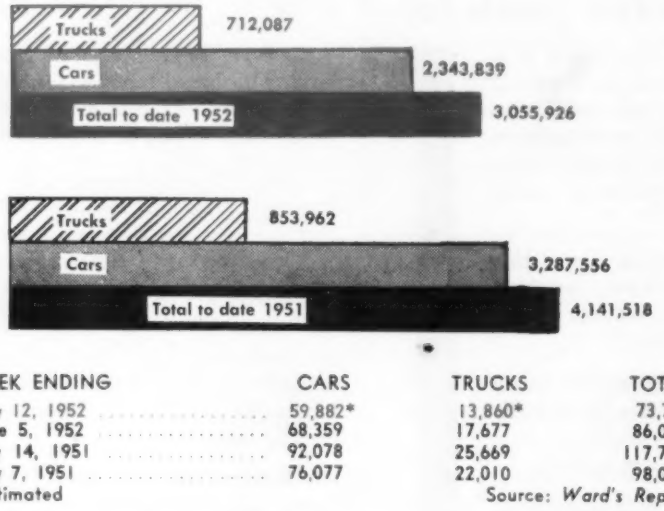
ter the end of the strike. It would be even longer if ore shipments continued to be held up as valuable shipping time slipped away.

In Michigan a rush for state unemployment benefits developed. The Employment Security Commission said claims filed by jobless doubled by the week. In steel-dependent plants, little but defense activities continued. Even these would feel the pinch soon.

Many defense industries were not yet in critical shape, however.

Automotive Production

(U. S. and Canada Combined)



WEEK ENDING	CARS	TRUCKS	TOTAL
July 12, 1952	59,882*	13,860*	73,742*
June 5, 1952	68,359	17,677	86,036
July 14, 1951	92,078	25,669	117,747
July 7, 1951	76,077	22,010	98,087

*Estimated

Source: *Ward's Reports*

What made matters worse was the knowledge that pipelines were completely empty. Even when steel was in production again, defense priorities would hold up deliveries for some time.

Six Month Shortage—One top executive predicted a steel shortage would extend for 6 months after the end of the strike. It would be even longer if ore shipments continued to be held up as valuable shipping time slipped away.

In Michigan a rush for state unemployment benefits developed. The Employment Security Commission said claims filed by jobless doubled by the week. In steel-dependent plants, little but defense activities continued. Even these would feel the pinch soon.

Many defense industries were not yet in critical shape, however. Packard said its defense work, jet engines and marine diesels, would continue indefinitely with no plans yet for cutbacks. All of Chevrolet's defense work was in good condition. Farsighted planning had provided excellent inventories of forged parts for continued output of parts and assemblies, Chevrolet's chief defense work.

Tank plants generally could see through July and into August. Ford's defense work was not far enough into production to feel the full effects.

New Model — Buick executives took time off from strike problems last week to unveil a new sports convertible. Of all the sports cars that have been shown by auto companies during the past year, it is the only one that could be called a production model.

The company has not disclosed its decision on production and probably hasn't arrived at a final conclusion. Spokesmen frankly admit that the market will be thoroughly probed before the go-ahead is given.

Continental Look.—The potential new model—the Skylark—is built on a 1952 Roadmaster chassis, with swept-down doors and cut-away fenders. Its front and rear end styling easily identify the Skylark as a Buick in spite of its continental look.

With regular Roadmaster convertibles running at somewhat less than $4000, it is doubtful if the Skylark could be put on the market at less than $5000.

Mechanic Training.—When new model cars are introduced and find their way into service garages for repair and service, the modern mechanic doesn't find out the new gimmicks by trial and error.

Weeks before the new models appear in dealer showrooms, mechanics all over the country are being specially trained to handle the new problems created by the new stylings and technical changes.

All the major producers follow the same general policy to insure that mechanics will be able to face the new conditions. As soon as the first cars come off the assembly line, some are taken to a factory garage where every possible service problem is studied.

OUTPUT: Ford Tries to Keep Going

Doing everything possible to maintain production . . . Rouge steel plant supplies only 50 pct of needs, not all types . . . Suppliers may take steel if they can convert it.

About the only smoke on the Detroit horizon last week came from the River Rouge where ten captive openhearth and five electric furnaces turned out steel for Ford Motor Co.

In the first days of the steel strike, it was frequently stated that Ford, with its own steel mills, would find itself in a better position to maintain production than its competition. Employees of the Ford mills are United Automobile Workers (CIO) and not on strike.

But is it working out that way? Only in part.

Not All Types—Ford started its shutdowns as early as anyone else. The reason is that even though the mill supplies half the company's needs, it does not supply all types of steel. Now, on 50 pct of its steel needs, the company is doing everything in its power to keep all plants operating, if only on a part time schedule. How to spread this steel has become Ford's big problem.

For example, Ford's annual capacity is rated on the basis of 975,000 tons of hot-rolled sheets, 485,000 tons of cold-rolled sheets, and 145,000 tons of hot-rolled bars. It's a good bet that operations now place more emphasis on bars at the expense of flat-rolled stock.

To keep its own plants working, Ford also has had to help out its suppliers. Whether or not Ford is letting ingots go for conversion isn't known, but Ford has let parts suppliers take steel in any state of processing if it can be converted to supplying needed parts.

Try Everything—It's generally stated that Ford will resort "to everything in the book" to keep production going. So far, part time schedules have been maintained.

It is not an easy proposition and costs are high. However, with Ford in a hot competitive race with Chevrolet, no avenue of production will be unexplored.

But already Ford is facing the same problem that will confront all steel mills before the year is over—dwindling ore piles. Even with the intense desire to extend production as long as possible, the company cannot afford to let future production be jeopardized.

Other mills may not be operating, but neither are they depleting ore stocks. Ford is doing both. Just how far down they intend to take the piles is the next question.

Where Is Union "Solidarity"?

Up to the seventh week of the steel strike, United Automobile Workers have remained strangely quiet in regard to the battle their brother steelworkers were fighting in the steel mill picketlines.

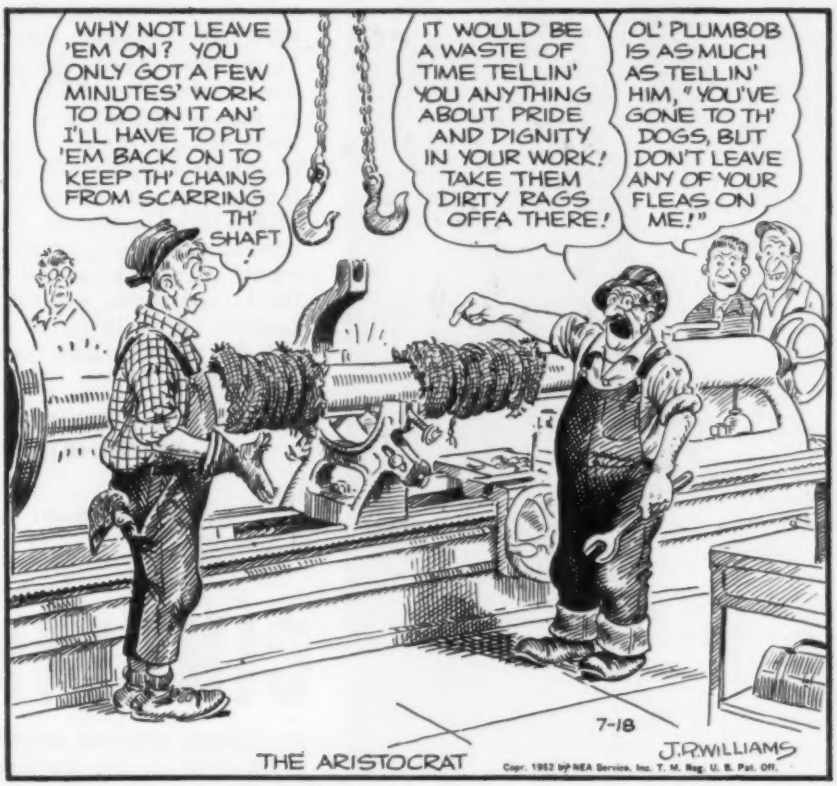
It is true that the publications of local unions were solid in backing the steelworkers in their demands for the union shop and equally consistent in denunciation of the steel "barons" who were holding out.

At the same time, there were not the usual rallying cries for a solid front across the UAW that might be expected.

This might be traced to the coolness between UAW President Walter P. Reuther and Philip Murray. It's common knowledge that when Murray steps down Mr. Reuther would like his present job as CIO president.

However, with 70 pct of the auto industry idle and an equal percentage of auto workers out of work, a blast from the UAW in support of the steel strike could be expected shortly. Mr. Reuther could hardly afford to be accused of not living up to the "solidarity" theme song of the UAW.

THE BULL OF THE WOODS — By J. R. Williams


WHY NOT LEAVE 'EM ON? YOU ONLY GOT A FEW MINUTES' WORK TO DO ON IT AN' I'LL HAVE TO PUT 'EM BACK ON TO KEEP TH' CHAINS FROM SCARRING TH' SHAFT!
IT WOULD BE A WASTE OF TIME TELLIN' YOU ANYTHING ABOUT PRIDE AND DIGNITY IN YOUR WORK! TAKE THEM DIRTY RAGS OFFA THERE!
OL' PLUMBOB IS AS MUCH AS TELLIN' HIM, "YOU'VE GONE TO TH' DOGS, BUT DON'T LEAVE ANY OF YOUR FLEAS ON ME!"
7-18
THE ARISTOCRAT
J.R.WILLIAMS
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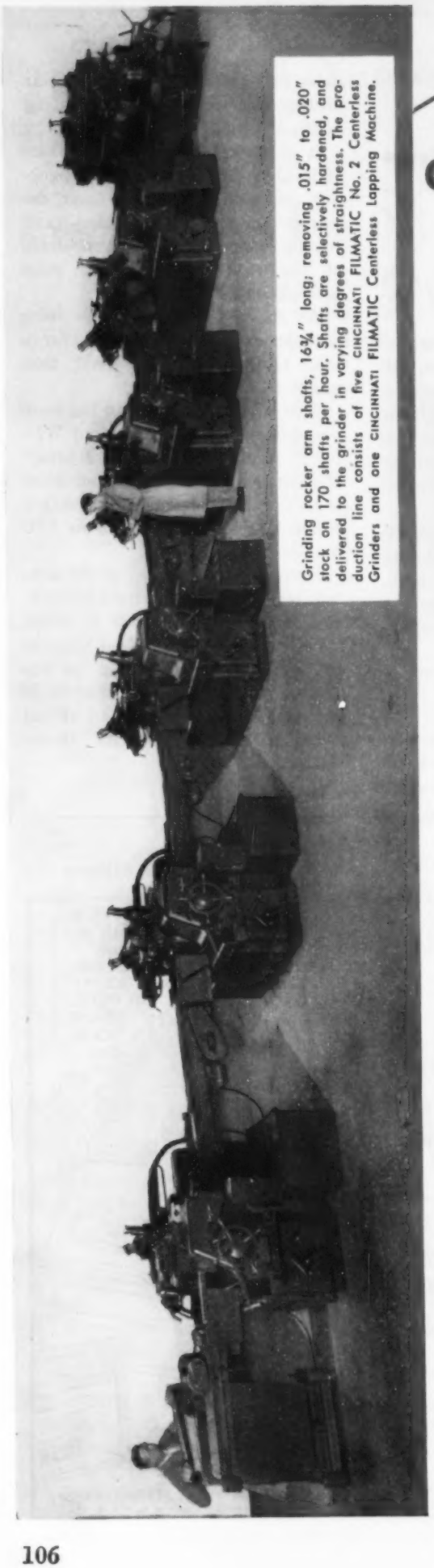


Grinding rocker arm shafts, 16¾" long; removing .015" to .020" stock on 170 shafts per hour. Shafts are selectively hardened, and delivered to the grinder in varying degrees of straightness. The production line consists of five CINCINNATI FILMATIC No. 2 Centerless Grinders and one CINCINNATI FILMATIC Centerless Lapping Machine.

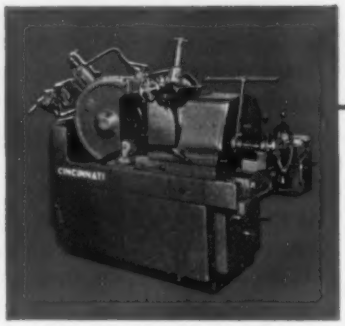
FILMATIC

No handling problem here

Continuous production setup grinds and laps ultra-precision work...

and only 2 men are needed to run 5 Centerless Grinders and 1 Lapping Machine

CINCINNATI



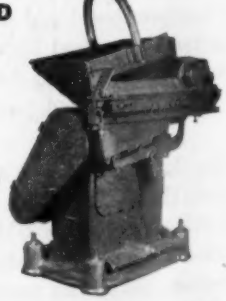
CINCINNATI FILMATIC No. 2 Centerless Grinder. Complete specifications may be obtained by writing for catalog No. G-611.

Tandem setups for continuous thrufeed centerless grinding operations are well known to the high production industries. But not so well known is the latest method of harnessing CINCINNATI FILMATIC Centerless Grinders together to simplify sizing adjustments and resetting. It works this way:

A Feedmatic Hopper automatically loads the work in the first machine. Thereafter, individually motor driven conveyors take over. They are mounted on the machines at the entrance side of the grinding throat and freely supported at the rear of the preceding machine. As the work leaves one machine, it is dropped on the conveyor for the next machine by a counterweighted escape device. Thus each unit can be individually adjusted without affecting the others, and it is unnecessary to maintain a straight line laterally.

To improve surface finish beyond the best obtainable by grinding, a CINCINNATI FILMATIC Centerless Lapping Machine can be placed at the end of the line of Centerless Grinders, as has been done in the production line illustrated. Setups of this type produce exceptionally high-quality work, with very little attention from the operator at each end of the line. ¶ CINCINNATI FILMATIC Centerless Grinders offer many advantages for continuous line production or job lots. FILMATIC grinding wheel spindle bearings will never fail; lubrication, including the infeed slides, is automatic; electrical control elements are built-in. And, to top it off, Cincinnati Application Engineers will be glad to help you with your high priority production problems.

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO



CINCINNATI Feedmatic Hopper. Type E illustrated for thrufeed work. Type B, for infeed work, also available. Catalog No. G-575-1.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Permanent Board to Study Resources?

Perhaps IMC statistics can be used by U. S. to help out permanent resources review department of NSRB . . . Study ways to implement Materials Commission proposals—By G. H. Baker.

The vast statistics on scarce minerals, metals gathered by International Materials Conference (Free World allocating agency under attack as a cartel) may be put to good use when that group meets either a natural or political death. National Security Resources Board may get a broader insight into the natural resources of the world, the consequent problems, and possibilities of development.

There is some feeling stirring in Washington that NSRB should house a permanent review body to keep itself informed on impending shortages and study means to renew supply. A profound study of resources was made recently by the President's Materials Policy Commission (THE IRON AGE, June 26, 1952, p. 56).

Need Money--Instructions were to take a thorough look at conclusions reached by the resources group and by the end of August to offer recommendations on how to carry out the Commission's proposals. NSRB hopes to complete its job on schedule, with the cooperation of other U. S. agencies.

One serious obstacle to the Board's work is the gap between the size of the appropriation it requested and the funds actually voted by Congress. A source close to the Board said it would be desirable, though impractical, to spend as much as half the 1953 funds in handling the project.

Long-Term Estimate — Should the present committee functions of IMC be placed under NSRB jurisdiction, much of the work in gathering and weighing information on world stocks of short-supply materials might be continued. Estimates on distribution of an item such as sulfur possibly could be projected for the remainder of the decade.

It is unlikely that international negotiation by this government for vitally-needed supplies will cease, no matter what fate awaits IMC. What appears certain, however, is that Congress will not agree to a future tie-in of State Dept. with an agency in the raw materials field

Manpower Waste—Defense Secretary Robert Lovett's commitment to establish a committee on manpower reorganization underscores a growing necessity for more efficient use of men and women in all types of jobs.

World War II and the current emergency have given taxpayers plenty of opportunities to complain that the armed forces were dragging in thousands of men without planning how to put them to work.

Industry Survey—Office of Defense Mobilization has been similarly surveying employee requirements for industry and now says that:

1. It will issue a policy "shortly" to provide for adding some 2 million handicapped persons, properly rehabilitated, to the labor force.

2. It is preparing to outline methods for bringing older workers into defense jobs. ODM cites plant records to show this group has fewer accidents and changes jobs less frequently than employees under 45.

3. It is developing a model plan to meet the maritime industry's wartime needs for trained manpower.

"All this beating of swords into plowshares and back again is getting me down."

Bomb Precautions—Meanwhile, plant superintendents and business office managers must live with the necessity of safeguarding employees and plant if an air attack comes.

Washington suggests safety measures to supplement the usual warning signals and repetition of raid drills that will preserve employee life. These should be elimination of fire, glass, and explosion hazards by:

Separating boilers, furnaces, and fuel storage tanks from shelter areas by construction of masonry walls.

Replacement of glass panels in doors and transoms near those areas and substitution of nonshattering materials.

Strengthening of the floor directly above the shelter, adding of supports, and building or improving of exits.

War Damage — When the new Congress meets in 1953 its members will have to grapple again with the problem of war damage indemnities.

A Senate Banking subcommittee has been worrying for more than a year over how a program for paying all or part of the war damage costs to industrial, commercial, and private property owners should be handled.

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CARS: NPA to Drop Unit Control

Production curbs on railroad rolling stock will be eased in fourth quarter . . . No quotas 'til end of steel strike . . . Output rate unaffected but still short of goal . . . Backlog drops.

The system of unit control in the production of freight cars and locomotives is to be dropped by National Production Authority, effective with fourth quarter allocations of materials for first quarter 1953 production.

Actual allocations for the fourth quarter must wait for the end of the steel strike. Officials said last week that most likely these would be limited to taking care of advance allotments.

Because of large carryovers from the second and third quarters, about 65 pct of allotments will be used to cover these carryovers.

Not Affected — Meanwhile, the strike had not seriously affected freight car production in June when deliveries dropped only slightly below May levels.

June deliveries were reported by American Railway Car Institute as 6411 units as compared with 6857 for May.

Despite insistence by Defense Transport Administration that new production must be at a rate of 33,000 units a quarter over the next 2 years in order to avoid a shortage, new orders are not coming fast enough to offset deliveries.

Backlog Down — Order backlog has dropped by more than 20,000 units since Jan. 1 despite the fact that production has failed to meet the 10,000-a-month goal set some time ago.

June orders amounted to only one-half of total deliveries. The Institute reported 3264 new orders. This reduced the order backlog to 99,615 on July 1 as compared with 103,910 as of June 1.

Freight car builders have requested NPA to issue CMP allotment tickets for the fourth quarter just as if no steel strike were in progress. Purpose is to enable the industry to maintain a place on mill schedules.

Another action sought by the industry is the removal of rail relays from under inventory controls. Officials have made no commitments. But NPA is preparing to issue an order requiring use of relays for sidetracks, etc., making some 25,000 or 30,000 tons of additional new rails available for the railroads.

More Imports?:

U. S. can bid for unused IMC quotas of copper, molybdenum, tungsten.

American manufacturers will be able to compete in world markets for any unbought supplies of copper, tungsten, molybdenum, nickel, cobalt recommended by International Materials Conference for allocation to Free World nations in the current quarter.

This right to bid for unaccepted portions of allocations awaiting IMC program participants was insisted upon by Congress in its recent handling of the Defense Production Act. It is the interpretation that a similar privilege applies to foreign businessmen if not all materials apportioned to this country are taken up. Greater quantities of all three items involved were recommended for distribution this quarter than in the previous 3 months. For example, proposals called for allocation of 744,290 metric tons of copper in the July-September period, as compared with 723,680 in the second quarter.

"Couldn't I just go as a tired steel negotiator!

Copper for Stockpile—Of this tonnage nearly half, or 368,100 tons, would be the U. S. share. Some of this nation's portion will, for the first time, be placed in the strategic stockpile.

Expectancy of higher tungsten production brought out a recommendation that 4468.7 metric tons of ores and concentrates be distributed to 24 countries, with a little remaining in reserve. Allocation of primary products was set at 219.3 tons. The U. S. is in line for 2335 tons of ores and concentrates only.

This country also would get 4118.5 tons of molybdenum ores and concentrates of a total 5391.25 tons on the recommended list for distribution and reserve.

IMC also proposed that the U. S. receive approximately two-thirds of the estimated free world supply of nickel and cobalt in the third quarter.

A total of 36.580 metric tons of primary nickel and nickel oxides is scheduled for distribution to 38 areas, with the expected U. S. share amounting to 24.626.5 tons.

Of the 2475.4 tons of cobalt figuring in third quarter calculations, this country is in line for 1583.9 tons.

SDPA Booklet on Output Control

Production control problems and their solution are discussed for the small manufacturer in a new management-aid leaflet issued by Small Defense Plants Administration.

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MACHINE TOOL CRAFTSMEN SINCE 1835

No Tin Cans in California by August!

West Coast canning industry may be hit hard . . . Some canners down to 2 weeks supply . . . Fruit may rot . . . Ford hopes to keep auto plant going . . . Furnace delayed—*By T. M. Rohan.*

The next western casualty of the steel industry strike may be the $825 million food canning industry. It will follow automobiles, construction and other industries already brought to their knees. But if not canned when ready, food products are gone for good. One official summed up the situation by saying "it looks like there'll be no tin cans in California by the end of August."

Early in the strike tin can manufacturers looked confidently to their 30 and 45-day stockpiles. Last week many still had supplies for a month but others were down to 2 weeks' supply.

The worst blow is yet to come. Few if any shipments of tinplate will be made for the first 20 or 30 days after resumption of work and long shipping time to the West will create further delays.

Perishable—The gap is what worries canners. Western states produce and can two-thirds of all the canned fruit in America and a quarter of all the vegetables.

Together with other canned foods such as fish, juices, pastes, etc., the 1952 crop is expected to top $825 million easily. California alone will account for well over $600 million. Many items such as apricots, pears, cling peaches and northwest salmon are available only in the West and would be in short supply if lost. National Production Authority estimated two-thirds of each week's crop will be lost if the strike continued another week.

Not in Time—The only western source of tinplate has been the 355,560-ton U. S. Steel Co. plane at Pittsburg, Calif., currently being expanded to 646,780 tons. Kaiser at Fontana, Calif., will have its tinplate mill going in a few months but not soon eough to be a factor in the present emergency.

The western office of Weirton Steel Co., only major tinplate producer in operation, was receiving almost hourly bulletins from NPA at the end of the week. Stocks for all but perishable food canning were frozen but there was considerable discussion of what was perishable. It was defined by NPA to exclude bottle tops for such items as mayonaisse and ketchup.

NPA inquiries led can manufacturers to suspect tinplate may be commandeered. Canners were asked to report on: (1) Third quarter requirements for perishables canning, (2) inventory at end of week and (3) any shipments of tinplate expected in third quarter.

Cars Slow Down — Automobile production was largely brought to a halt except for Ford which was busily butt-welding narrow sheets into wide sheets in the East. The Ford plant at Richmond, Calif., near San Francisco, operated intermittently but expected to reopen July 21 for the remainder of the month at least.

"Well, there's our answer."

By a far-reaching system of day-by-day inventory control including materials in transit, Ford expects to keep the plant going. In the last 2 weeks badly needed parts have been "robbed" from railroad cars en route and flown in to assembly lines.

Even airplane factories which use steel only sparingly were worried because they had left only 2 or 3 weeks' supply of their highly specialized types.

No Blast Furnace Yet — Yolo Steel will build its blast furnace in Sacramento, Calif., with private financing despite offers of free land from other towns and repeated offers of Japanese capital, G. I. Dumond, president, said last week.

Dumond said adequate private capital is now assured and only the steel strike is holding up plans for the project which was granted a $44 million certificate of necessity. He said completion of a deep water channel to Sacramento in the next few years will give a substantial advantage in shipping rates.

Want Carrier Job — The San Francisco naval shipyard, languishing since World War II days, last week put in its bid to construct a sister ship to the 66,000-ton Forrestal recently approved by the Defense Dept. Western officials have been waging a vigorous campaign for more shipbuilding to prevent death of the industry.

They wired President Truman and legislative and military officials to get the job.

A San Francisco delegation recently visited Washington.

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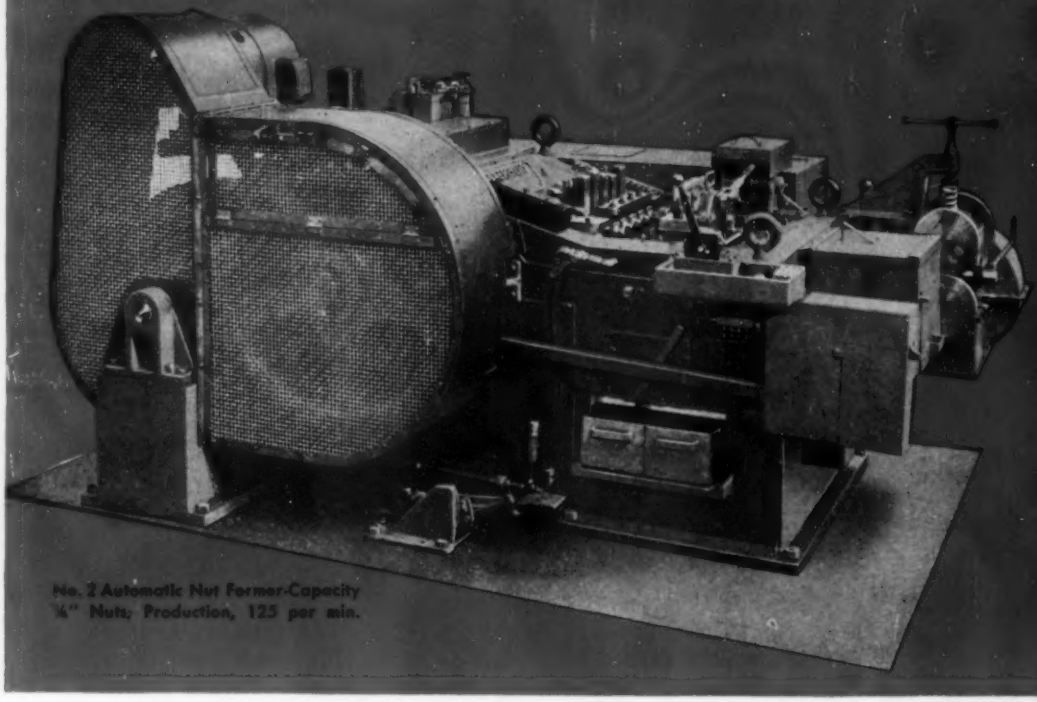

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WF-2

Will Steelworkers Beat Gun on Strike?

Canada's USW impatient at delay in settling U. S. strike . . . May make demands now instead of waiting . . . What strikes may come about . . . Warn of mass layoffs—*By F. Sanderson.*

The United Steelworkers of America, Canadian division, is chafing at the bit over delay in settling the American steel strike. They now propose not to wait—but instead to go ahead with their demands on the Canadian steel industry.

Although not definite yet, it is possible 10 to 15,000 steelworkers in Ontario and Quebec may strike by July 20 to protest tardiness of signing a new contract with the Steel Co. of Canada.

The union is threatening "effective economic action." That means a strike—against the Steel Co.'s Hamilton mill and Ontario, Quebec fabricating plants. Strike motive would be to bring wages into line with those in the U. S.

Union officials say workers are fed up waiting for Ontario and Quebec labor departments to set up conciliation boards. The contract ended Apr. 1.

Warns of Layoffs.—Steel Co. of Canada is facing raw material shortages, especially iron ore. It has warned its 9000 Hamilton employees to expect mass lay-offs in October unless the American steel strike ends quickly.

Algoma Steel Corp., Sault Ste. Marie, some 4000 workers are waiting for a conciliation board to break a wage dispute deadlocked since the last contract expired May 1.

The issues between the 4000 workers at Dominion Steel & Coal Co., Sydney, N. S., is in the hands of a conciliation board whose report is expected any time.

Steelworkers' Demand — Canadian steelworkers are seeking a uniform nation-wide rate of $1.46 per hr, as compared with the present basic rate of $1.36 an hr for Hamilton and Sault Ste. Marie workers and $1.32½ for the Sydney workers.

The chief item in the dispute is the union's demand for a complicated job-evaluation scheme to widen the margin between skilled, semi-skilled and unskilled men.

Steel Shortage — Canadian government officials are worried over the continuation of the U. S. steel strike. A serious steel shortage looms in the Dominion.

K. S. Harris, director of Defence Production Dept.'s steel division, last week echoed reports published on this page a little while back. He said Canadian industry faces sharp cuts in production if the strike is not settled soon. He called a long steel strike in the U. S. a national calamity for Canada.

Imports of U. S. steel are now only about 15 pct of normal. Stockpiles would be exhausted in about 4 weeks, Mr. Harris estimated. Producers of automobiles, electrical equipment and machinery would be particularly hard hit. The construction industry, now racing to complete defense building, would also be hurt. Many needed sizes of structurals are made only in the U. S.

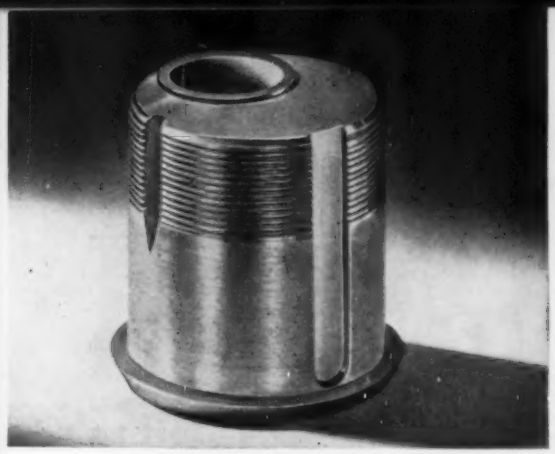
No Ore—Even more serious, according to Mr. Harris, is the halting of iron ore shipments. Canadian steel mills, like their U. S. counterparts, are normally dependent on the Great Lakes shipping season for their yearly ore supply. They are devouring their stockpiles now while the shipping season slips away. Winter's outlook for central Canadian mills is becoming critical.

Canada's booming oil industry has already been seriously affected. Expansion has been slowed almost to a standstill by a shortage of well casing. Drilling plans have been called off at some 80 sites. A number of other wells slated for early operation are unable to start. Even if the steel strike ends immediately western Canada's oil fields will feel its impact for months to come.

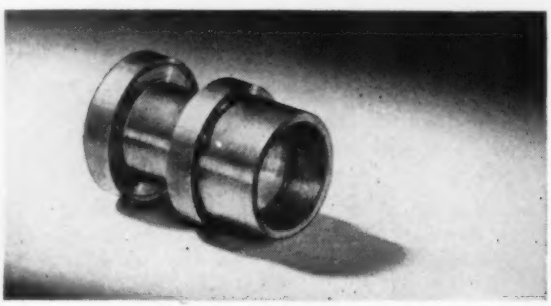
Pipe has so far been available for the Trans Mountain Pipe Line, but future supplies are doubtful. Heavy plate for oil tanks is now very short in the West.

Magnesium Expansion—Aluminum Co. of Canada will spend $2 million to boost magnesium output at its Arvida, Que., plant to 4000 tons per year. Present annual capacity is 1000 tons. New facilities are expected to be in place by April, 1953.

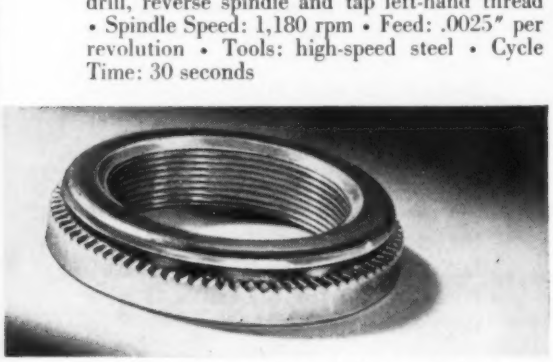
Expansion plans stem from the recent agreement to increase exports to Great Britain. Contract calls for U. K. to take 2640 tons annually for the next 20 years. Alcan will use part of its remaining output to make aluminum-magnesium alloys. Balance will be sold on the open market.



LOCK CYLINDER. Metal: 1⅜″ dia. brass • Machine: model 601 New Britain Gridley • Operations: *cross slide*—rough form, finish form, break down cut off, side mill, vertical end mill, final cut off; *tool slide*—face, drill offset hole, ream and counterbore offset hole, thread • Spindle Speed: 1,324 rpm • Feed: .006″ per revolution • Tools: high-speed steel • Cycle Time: 7.3 seconds



CARPENTER'S PLANE PART. Metal: ⅝″ B1113 steel • Machine: Brown & Sharpe Automatic Screw Machine • Operations: *front cross slide*—form; *rear cross slide*—cut off; *turret*—feed stock, spot drill, drill 13/32″ hole, tap drill, reverse spindle and tap left-hand thread • Spindle Speed: 1,180 rpm • Feed: .0025″ per revolution • Tools: high-speed steel • Cycle Time: 30 seconds



KNOB INSERT. Metal: 1⅞″ round aluminum • Machine: model 61 1⅝″ New Britain Gridley • Operations: *cross slide*—form, knurl, cut off; *tool slide*—spot drill, tap, ream, recess • Spindle Speed: 1,600 rpm • Feed: .005″ per revolution • Tools: high-speed steel • Cycle Time: 7 seconds

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More Recommendations for Deaf Ears?

Another Senate group urges aids for tool industry . . . Who will listen though? . . . Ask halt to low price sales after crisis, tax relief . . . Bad news comes in M-41—By G. Elwers.

Washington talks a good fight on the machine tool shortage, but does little about it. Machine tool builders' hopes were raised back in February when a Senate committee report advocated several steps to help out the industry. But nobody took action on the recommendations.

Now, from another Senate group, this time a subcommittee of the Senate small business committee, comes still more recommendations. Again, the suggestions make sense. But probably they are falling on deaf ears.

Wishful Hoping—The committee itself apparently doesn't expect much to happen. It winds up its report with the hope that the new Advisory Committee on Production Equipment will discuss the committee's recommendations. This seems to indicate it doesn't expect NPA or other government agencies concerned to pay much attention.

First, the committee suggests that responsible government officials resolve now not to allow surplus tools to be sold at low prices at the end of the crisis. This noble thought has been advanced many times before. And probably no one in Washington would disagree.

But no one has taken the responsibility of going on record that it will not happen. In fact no one seems to know who can make such an assurance.

Spur Replacement — Next, the committee recommends consideration of changes in the Internal Revenue Code and the regulations governing tax amortization of capital equipment. Purpose is to encourage more frequent replacement of machine tools.

Several groups are trying to persuade the Treasury Dept. to do this. The committee's report will give them additional ammunition.

Ready for Action—Finally, the committee urges consideration of the insurance program. This consists of standby war plants kept fully tooled and ready for a defense emergency.

Some day, the machine tool industry hopes, a Congressional committee will write some legislation instead of just making recommendations. That seems the only way to get some action.

Worse News—Two weeks ago this column said the amendment to M-41 would not permit non-rated production of the machine tools in greatest demand. The bad news is now out. The list of excluded equipment is even longer and broader than had been expected.

The list of tools reserved exclusively for defense buyers includes the vertical turret lathes and cross bed lathes needed by jet engine builders. It covers horizontal and vertical boring mills. Tracer controlled lathes are on the list, as are some sizes of turret lathes.

Milling machines, grinding machines, and automatic screw machines are also selectively on the list. Certain sizes are included while others are freed.

Liberty to Export?—It is still not certain how free machine tool builders will be to sell overseas under the amended M-41. This has been a particularly sore point. When the restrictions on non-rated production were clamped down last year, the industry was assured the effect on foreign sales wouldn't be great.

An ECA man told a National Machine Tool Builders' Assn. meeting that most foreign orders, whether or not for defense plants, would be granted priorities (THE IRON AGE, Nov. 22, 1951, p. 71).

Tough Nut—But it hasn't worked out that way. The Foreign Div. of NPA has been extremely tough about permitting shipments of machine tools overseas.

Even when all other government agencies concerned approve a request, its chances of getting by the Foreign Div. are slim.

Meanwhile, foreign buyers continue to turn elsewhere to fill their needs.

Dollars Disappear — A foreign machine tool builder who makes a sale here can't necessarily spend the dollars he earns to buy a U. S. machine tool he may need. His government takes away most of his sale dollars, replacing them with local currency. Most of what's left can only be spent for items approved by his government. Only a small percent of his dollar earnings can go to buy anything he wants.

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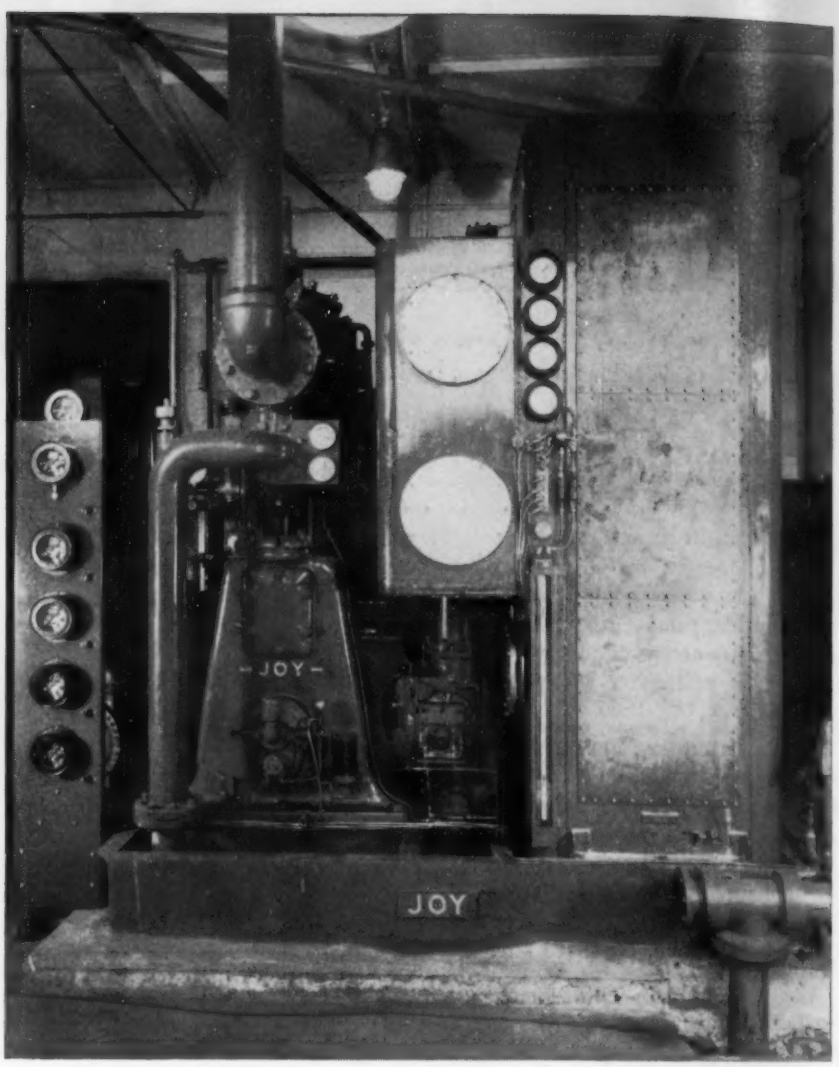

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The Iron Age

SALUTES

Gordon H. Chambers

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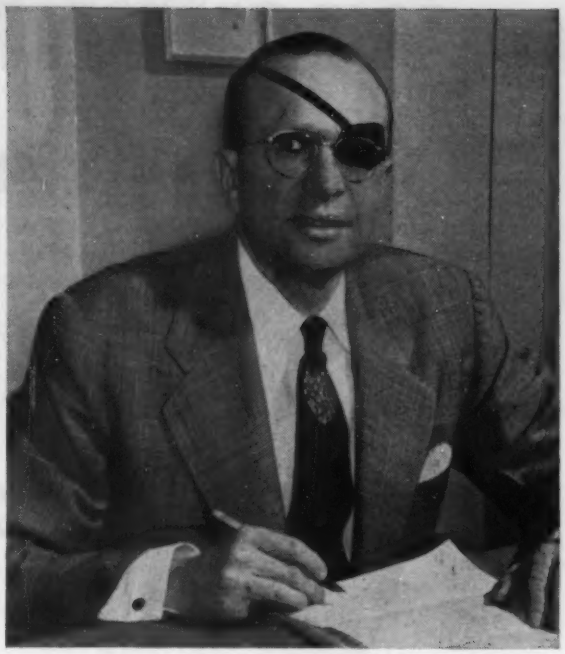

GORDON H. CHAMBERS, the new president of Foote Mineral Co., is a dynamic yet soft-spoken man. A graduate of the University of Pennsylvania, he joined Foote as a sales engineer in 1928 and rose steadily in the firm.

Then in World War II he served 4 years as an Ordnance Corps colonel. As Deputy General Purchasing Agent he supervised procurement of all supplies, billets, civilian personnel and most other services for U. S. troops on the European Continent.

One eye was lost and the other severly damaged when his jeep was blown up by a land mine. Totally blind for a time, Gordon Chambers fought his way back to a normal life.

Besides the Purple Heart, Gordon was decorated with the Legion of Merit, the Croix de Guerre, the French Legion of Honor and the Order of the British Empire.

Back with Foote after his recovery, Gordon took over executive vice-president's duties to go along with his job as treasurer. Then, this year, he was elected president of the firm.

An authority on zirconium, he has several patents on this metal, all assigned to Foote, and he has written many technical articles.

Gordon loves kids (he has two: Joyce, 11, and Robert, 4) and is trustee of the Springside School in Philadelphia. He is on the Board of Directors of the Philadelphia Cricket Club. Other favorites are travel, photography.

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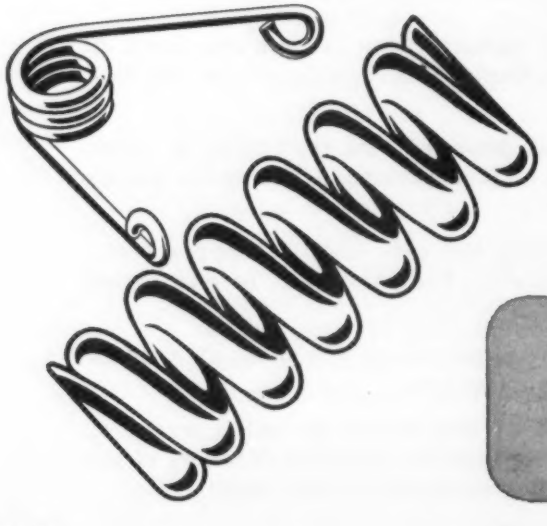

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H. C. Little, director of employee relations, named assistant to the president, AMERICAN CYANAMID CO., New York.

Irwin Borsuk, named director of engineering, WIGTON-ABBOTT CORP., Plainfield, N. J.; **Walter V. Coleman,** appointed chief engineer; and **Ben Belkin,** named chief architect.

Mario L. Corneo, named director, Import-Export Sales, THE CASE CHEMICAL CO., Cleveland.

H. H. Heath, appointed comptroller, Baroid Sales Div., NATIONAL LEAD CO., New York; and **Gordon Robertson,** appointed assistant comptroller.

Schaeffer E. Specht, appointed executive sales engineer, RESEARCH CORP., Bound Brook, N. J.

Martin George, appointed chief engineer, design and development division, THE COLUMBIAN VISE & MFG. CO., Cleveland.

Paul E. Wolfe, appointed applications engineer, HELI-COIL CORP., Danbury, Conn.

Joseph S. Milazzo, named assistant plant superintendent in charge of dyestuff production, PITTSBURGH COKE & CHEMICAL CO., Pittsburgh.

Charles P. Loucks, made production manager, Eastern Clay Products Dept., INTERNATIONAL MINERALS & CHEMICAL CORP., Chicago, Industrial Minerals Div.; and **John D. McKenzie,** named assistant to the vice-president of this division.

Colman Eaton, appointed manufacturing engineer, Aeroproducts Div., GENERAL MOTORS CORP., Dayton.

James M. Bennan, elected chairman of the board, and re-elected as president, JEFFERSON ELECTRIC CO., Bellwood, Ill.; and **Edward J. Bennan,** elected executive vice-president and a member of the board of directors.

Ambrose C. Miller, appointed product engineer, THE WILLIAM BRAND & CO., INC., Willimantic, Conn.

Verne Pulsifer, appointed a supervisor, metals department, ARMOUR RESEARCH FOUNDATION of Illinois Institute of Technology.

Thomas A. Stratford, appointed to newly created post of assistant manager-Product Development and Advertising, THE AMERICAN WELDING & MFG. CO., Warren, Ohio.

David B. Curran, appointed assistant manager, Fastener Div., Nashua, New Hampshire, EDGCOMB STEEL OF NEW ENGLAND, INC.

Robert A. Ruleff, named western sales manager, BART-MESSING CORP., Bellsville, N. J.

John R. Walker, appointed assistant manager, bar and semi-finished materials sales section, UNITED STATES STEEL CO., Pittsburgh.

M. J. Merlin, appointed Cleveland factory manager, THE CLEVELAND GRAPHITE BRONZE CO.; and **Hugh S. Highet,** named chief manufacturing consultant.

C. O. KLEINSMITH, appointed executive vice-president, National Carbon Co., a division of Union Carbide & Carbon Corp., N. Y.

RALPH M. WATSON, named director of research, Worthington Corp., Harrison, N. J.

P. M. BUHRER, appointed executive vice-president, National Carbon Co., a division of Union Carbide & Carbon Corp., N. Y.

Personnel

Continued

H. A. Martin, appointed engineering and production director, CALDWELL INDUSTRIES, INC., Kent, Ohio.

Charles D. Townsend, appointed director of manufacturing, THE LA POINTE-PLASCOMOLD CORP., Rockville, Conn.

John P. Edwards and **Carl I. Gochenour**, transferred to the Sales Dept., HOOKER ELECTROCHEMICAL CO., Niagara Falls, New York.

James H. Phillips, joins the staff of STEEL TRADING CORP., Pittsburgh.

Stuart Smith, appointed special representative to Army Air Force at Wright-Patterson Field, Dayton, by REYNOLDS METALS CO., Louisville.

Benjamin Schwartz, named New York representative, THE LUNTZ IRON & STEEL CO., Canton, Ohio.

Thomas J. Walne, appointed general manager of oil field sales, THE NATIONAL SUPPLY CO., Pittsburgh.

William U. Cigliano, named assistant general manager, RUSSELL, BURDSALL & WARD BOLT & NUT CO., Port Chester N. Y.; **Russell Hoehl**, appointed assistant district manager, Philadelphia office; and **Vernon Paulson**, named assistant Western sales manager, Chicago office.

Robert G. Brossard, appointed sales agent, New York District office, AMERICAN CAR & FOUNDRY CO.

Hal P. Kibbey, appointed Chicago district manager, UNITED STATES STEEL SUPPLY DIV.

Dana L. Mock, atomic physicist, joins Solid Propellent Group, ATLANTIC RESEARCH CORP., Alexandria, Va.

Oren H. Persons, Jr., rejoins EDGCOMB STEEL CO., Philadelphia, as manager of Specialty Steels.

E. J. Lickwar, appointed sales representative, Pittsburgh area, ALLOY STEEL PRODUCTS CO., INC.

J. H. Berry, appointed general manager, CANADIAN ARSENALS LTD.

JOHN M. CAMPBELL, named assistant technical director, general manager's staff, General Motors Research Laboratories, Detroit.

LLOYD L. WITHROW, named head, Organic Chemistry Dept., General Motors Research Laboratories.

DUNCAN A. BLACK, named manager, newly combined Power Piping and Sprinkler Div., Blaw-Knox Co., Pittsburgh.

PAUL L. WRIGHT, appointed manager, Buffalo Plant, Joseph T. Ryerson & Son, Inc.

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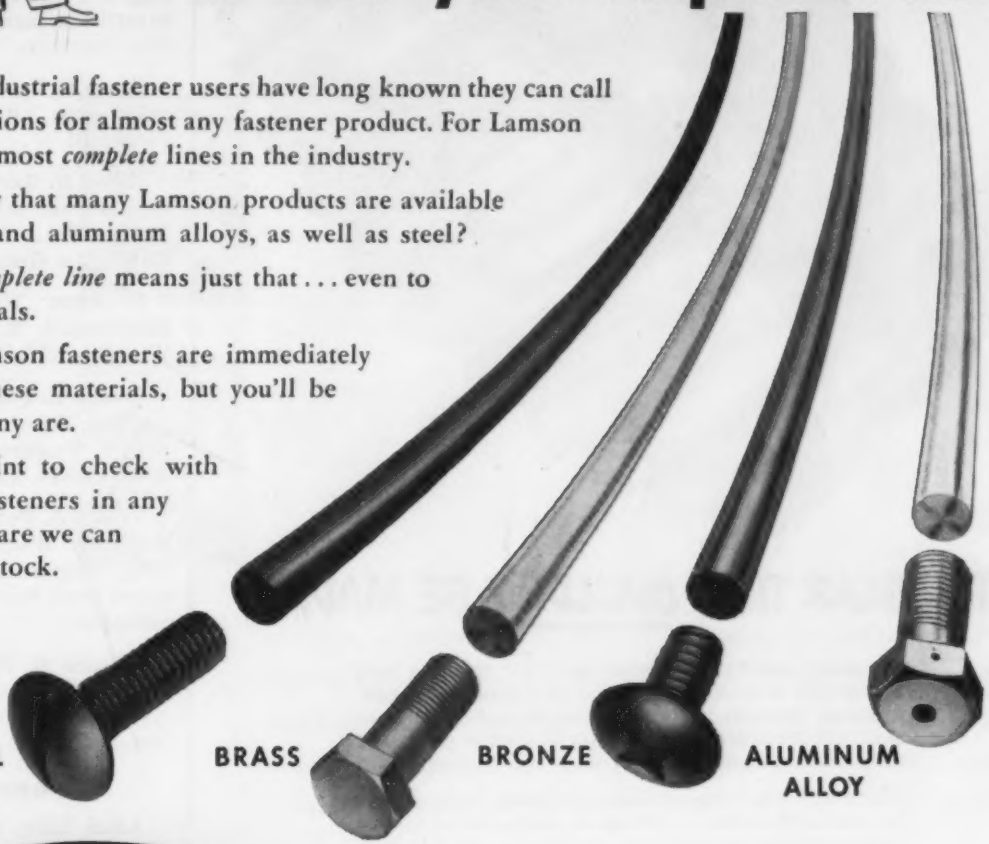

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Personnel

Continued

Frederick P. Salzman, named works manager, original equipment division, THE CLEVELAND GRAPHITE BRONZE CO., Cleveland; and **William H. Hagy,** named comptroller.

D. F. Bradley, appointed manager, Detroit district sales office, SHELL CHEMICAL CO., New York.

John E. Tomes, named Northern Division Sales manager, BULLDOG ELECTRIC PRODUCTS CO., Detroit.

J. C. Doyle, appointed sales and advertising manager, FORD MOTOR CO., Dearborn.

Edwin B. Rose, appointed sales representative, THE MEHL MFG. CO., Cincinnati.

Milton H. Gardner, appointed assistant general sales manager, Electro-Motive Div., GENERAL MOTORS CORP., La Grange, Ill.

J. Allan Wickett, named chief metallurgist, BRILLION IRON WORKS, INC., Brillion, Wis.

George E. Prifold, named manager, Landing Vehicle, Tracked Div., of Ingersoll Products Div., BORG-WARNER CORP., Kalamazoo, Mich.

Vernon A. Peters, promoted to sales manager, HANCOCK STEEL CO., INC., Detroit; and **Glenn R. Tyler,** becomes steel buyer and assistant sales manager.

Edward B. Blanc, appointed sales engineer, Drill Steel Div., CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh.

OBITUARIES

Adam Lilly, superintendent of the mason department, The Indiana Harbor Works of Inland Steel Co.

Gerald J. Weckmueller, assistant superintendent of blast furnaces, The Indiana Harbor Works of Inland Steel Co.

Spiro George Tsamis, 55, a special representative, United States Steel Export Co., suddenly in Raleigh, N. C.

Allen J. Frantz, 61, chief engineer, The Armco International Corp., Chicago office, in Italy recently.

Karl W. Gass, vice-president, Amsler Morton Corp., at his home recently in Pittsburgh.

Howard Curran Little, 55, headquarters treasury staff assistant, Westinghouse Electric Corp., Pittsburgh, recently.

For all steels but boron—

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Technical Articles

Prediction of End-Quench Hardness In Steels SIMPLIFIED

By M. A. Orehoski
Research Technologist
and
J. M. Hodge
Research Associate
United States Steel Co.
Pittsburgh

A faster, better method has been developed by the authors for estimating a Jominy curve from the first 1/16 in. to the region of 50 pct martensite if both carbon content and D_I are known. Accuracy of the method is reasonably good provided the two basic factors are reliable. The method is not too accurate on boron steels.

The relationship between hardenability values in terms of 50 pct and higher martensitic microstructures has been defined[1]. In these studies data were also presented on the relationships among the percent martensite, carbon content, and hardness. More recent findings on the relationship between ideal diameter, D_I, and distances along the end-quench bar, permit the use of these relationships to predict the end-quench-hardness curve for a steel, if the 60 pct martensite hardenability is known or can be calculated.

Jominy end-quench tests with steels of successively greater hardenabilities at a single carbon content, show that the end-quench curves fall into a pattern somewhat like that of Fig. 1. For a greater carbon content, another family of curves must be considered, Fig. 2. To represent a range of carbon content, a family of curves must be drawn for every 0.01 or 0.02 pct increment in carbon. The resulting large group of curves may then serve as a basis for estimating an end-quench curve. By taking advantage of certain relationships already published[1], the authors have simplified the method of predicting the end-quench curve for a steel of known hardenability and carbon content.

This method differs in certain respects from a method proposed by Field[2], as it involves substituting in the known relationship between microstructure and hardenability (1) a hardness value for the given microstructure and carbon content, and (2) a Jominy distance for the corresponding D_I. These substitutions pro-

"These curves enable a prediction of the hardness corresponding to . . . pct martensite . . ."

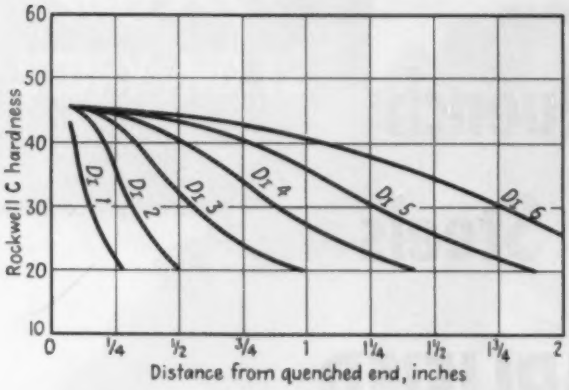

FIG. 1—Typical end-quench-hardness curves showing the effect of hardenability on hardness of 0.20 pct C steels.

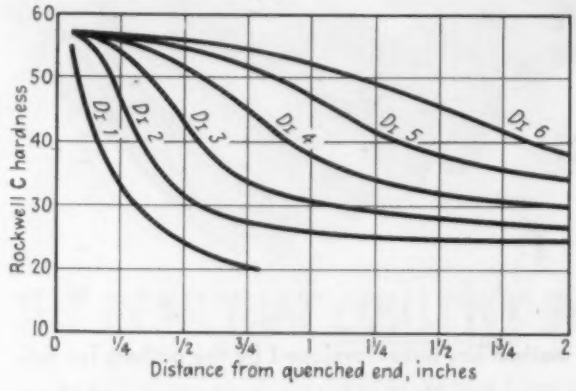

FIG. 2—Typical end-quench-hardness curves showing the effect of hardenability on hardness of 0.40 pct C steels.

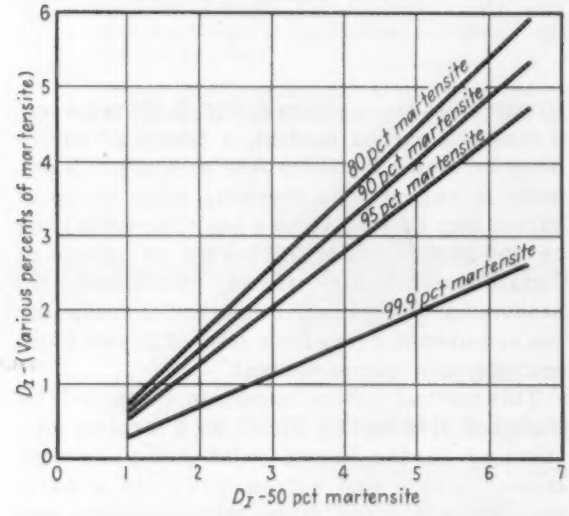

FIG. 3—Average relationship between hardenability based on 50 pct martensite and higher percents of martensite.

vide data for an end-quench-hardness curve, based on the previously established relationships among microstructures, in terms of percent martensite, hardenability, hardness, and carbon content.

Since hardenability is most commonly specified in terms of a limiting end-quench-hardness curve, a hardness curve developed in the above manner may often be of more practical significance than hardenability values in terms of D_I.

The revised curve expressing the relationship between distance along the end-quench bar and D_I previously published[3] indicates lower D_I values for Jominy distances up to ¼ in. than do other curves for this relationship.

Because of the lower D_I values for Jominy distances of less than ¼ in., the earlier relationships between 50 pct martensite D_I values and those corresponding to higher percents of martensite have been revised. The new values are shown in Fig. 3.

Before an end-quench-hardness curve can be predicted, the units for the revised relationship between D_I and microstructure, Fig. 3, must be converted into distances along an end-quench bar; and microstructures, into hardness for a given carbon content. The results can be expressed in these new units in the form of an end-quench-hardness curve up to the point of the 50 pct martensite hardness.

The relationships among carbon content, microstructure, and hardness are reproduced in Fig. 4. These curves enable a prediction of the hardness corresponding to 99.9, 95, 90, 80, or 50 pct martensite and serve to establish the ordinate for the end-quench-hardness curve[1].

From the relationship between D_I value and distance from the quenched end of a bar, the D_I values for the various martensite levels were converted into end-quench distances, as shown

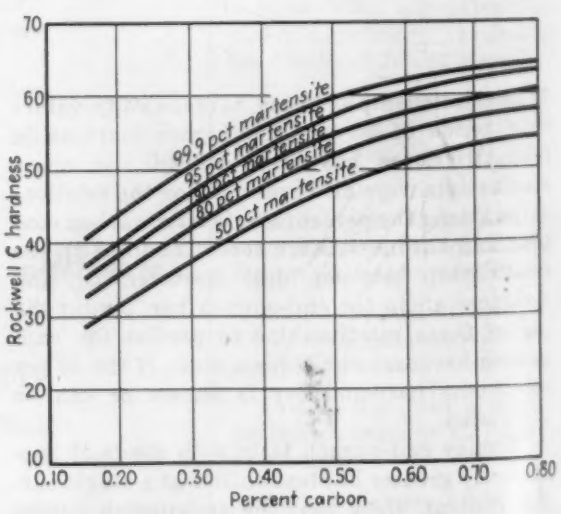

FIG. 4—Effect of carbon on hardness of structures containing various percents of martensite.

in Fig. 5. Therefore, if either the 50 pct martensite point along an end-quench bar or the D_I value at this point is known, the abscissa of the end-quench-hardness curve can be read for 99.9, 95, 90, 80 and 50 pct martensite.

The end-quench-hardness curve of a steel can be estimated by using Fig. 4 to determine the hardness of various percents of martensite if the carbon content is known, and by using Fig. 5 to determine the distances at which these percents of martensite occur if the D_I value based on 50 pct martensite is known, see box, "How It Works."

Examination of the relationships of Fig. 4 suggests a method of expediting the procedure previously described. The vertical distances between the curve for 50 pct martensite and other curves for higher percents of martensite are reasonably uniform over the range of carbon content 0.15 to 0.60 pct. These vertical distances are equivalent to the following hardness increments in relation to the 50 pct martensite curve:

80 pct martensite —4.5 Rc hardness points higher; 90 pct martensite —7.5 Rc hardness points higher; 95 pct martensite —9.5 Rc hardness points higher; 99.9 pct martensite —13.0 Rc points higher.

By using these hardness increments and the data of Fig. 5, a family of end-quench-hardness curves expressed as a function of D_I can be constructed for microstructures containing from 99.9 to 50 pct martensite. Such a family of curves is shown in Fig. 6; the hardness increments serve as the ordinate of this graph, and the data in Fig. 5 determine the distances, the abscissa, at which various percents of martensite occur for any given D_I.

To illustrate, consider a steel with a D_I of 6 in. From Fig. 5, it is seen that for this D_I, 99.9 pct martensite occurs at 6/16 in.; 95 pct, at 15/16 in,; 90 pct, at 18/16 in,; 80 pct, at 22/16 in.; and 50 pct, at 27/16 in. On plotting these distances at the respective martensite levels, a smooth curve for a D_I of 6 in. may be drawn through the five points. For the steels included in the present study, the hardness at 1/16 in. was approximately 1 Rc hardness unit greater than that of a structure containing 99.9 pct martensite. Therefore, the curves in Fig. 6 were extended to the 1/16-in. distance from the quenched end of a bar.

When the data of Figs. 6 and 4 are tabulated, Tables I and II, the estimation of an end-quench curve is a relatively simple matter if both the carbon content and the D_I of the steel are known. See "Shortcut."

For example, consider a steel such as AISI 4145 with a D_I value of 5.4 in., based on 50 pct martensite, and a carbon content of 0.45 pct. From Table II, the estimated hardness of a structure containing 50 pct martensite is a 45.5 Rc for a carbon content of 0.45 pct (Step 1). From Table I the hardness increments at 1/16-in. increments are 14.0, 14.0, 13.5, 13.5, 13.0, 13.0, 12.5, 12.0, 11.5, 11.0, 10.5, 10.0, 9.0, 8.5, 8.0, 6.5,

HOW IT WORKS

1. From Fig. 4, determine the hardness for 50 pct martensite corresponding to the carbon content.
2. Similarly from Fig. 4, determine the 99.9, 95, 90, and 80 per cent martensite hardness values.
3. From experiment or by calculation, determine the D_I value for 50 pct martensite.
4. With this D_I value, determine in Fig 5 the end-quench distances corresponding to 99.9, 95, 90, 80, and 50 pct martensite.
5. From these data, plot the end-quench-hardness curve.

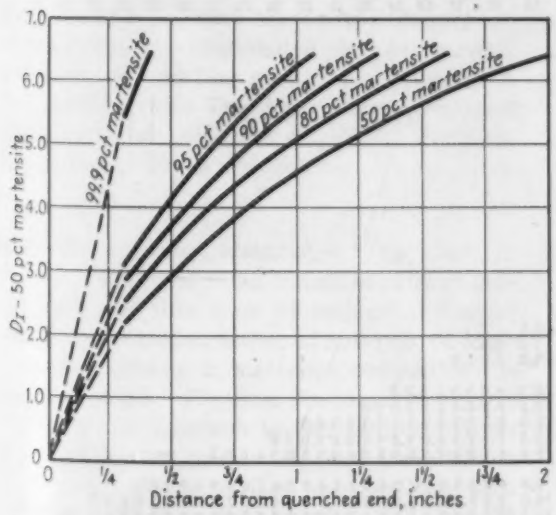

FIG. 5—D_I and percents martensite distances.

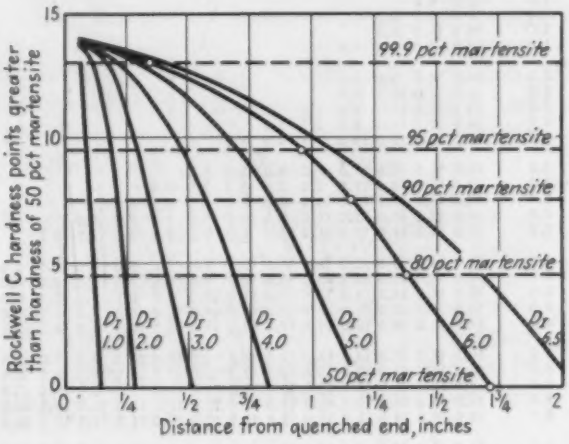

FIG. 6—Relationship between hardenability and distance at which various percents of martensite occur on Jominy bar.

"Accuracy of the proposed method of estimating end-quench-hardness . . . is reasonably good . . ."

5.5, 4.5, 3.5, 2.5, 1.0 and 0.0 for a D_I of 5.4 in. (Step 2). The addition of these hardness increments to the estimated hardness, 45.5 Rc, determines the Rc hardness at each 1/16 in. increment along the end-quench bar (Step 3). The plotting of those values produces the estimated curve in Fig. 7 (Step 4). The actual hardness curve for this steel is also shown in the plot for comparison.

Accuracy of the proposed method of estimating end-quench hardness from carbon content and D_I is reasonably good provided these two factors are reliable. This is shown in a comparison of the actual and the estimated hardness of 135 commercial steels, Figs. 8, 9, and 10. The

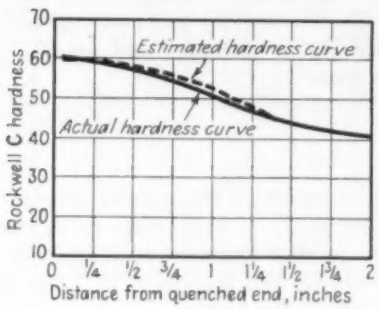

FIG. 7—Actual and estimated end-quench-hardness curves as determined for an AISI 4145 steel.

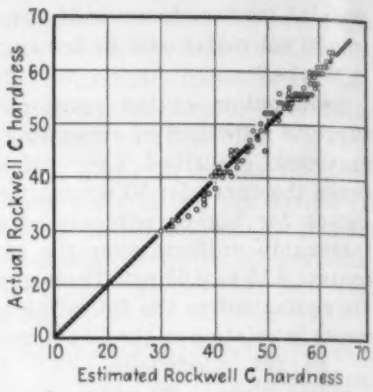

FIG. 8—Relationship between actual and estimated hardness values at 1/4 in. from the quenched end of Jominy bars.

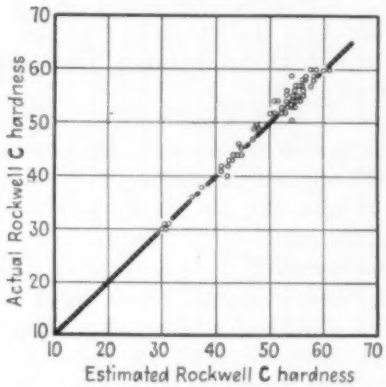

FIG. 9—Relationship between actual and estimated hardness values at 1/2 in. from quenched end of Jominy bars.

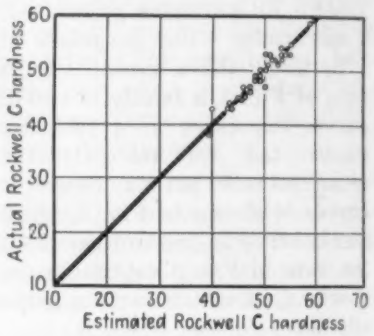

FIG. 10—Relationship between actual and estimated hardness values at 3/4 in. from quenched end of Jominy bars.

TABLE I

HARDNESS INCREMENTS TO BE ADDED TO HARDNESS OF 50 PCT MARTENSITE
(Determined from Fig. 4)

Distance from Quenched End in Sixteenths of an Inch

DI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1.0	11.5	1.0																														
1.2	13.0	4.5																														
1.4	14.0	9.0	0.0																													
1.6	14.0	11.0	4.5																													
1.8	14.0	12.0	7.0	0.0																												
2.0	14.0	12.5	9.5	3.5																												
2.2	14.0	13.0	10.5	6.5																												
2.4	14.0	13.5	11.0	8.0	3.0																											
2.6	14.0	13.5	11.5	9.5	5.5	1.5																										
2.8	14.0	13.5	12.0	10.0	7.5	4.0	1.0																									
3.0	14.0	13.5	12.5	11.0	9.0	6.0	3.0	1.0																								
3.2	14.0	14.0	13.0	11.5	9.5	7.5	5.0	2.5	0.5																							
3.4	14.0	14.0	13.0	12.0	10.5	9.0	7.0	4.5	2.5	0.0																						
3.6	14.0	14.0	13.0	12.0	11.0	9.5	8.0	6.5	4.5	2.5	0.0																					
3.8	14.0	14.0	13.0	12.5	11.5	10.0	9.0	8.0	6.0	4.0	2.0	0.0																				
4.0	14.0	14.0	13.5	12.5	12.0	11.0	10.0	9.0	7.5	6.0	4.0	2.0	0.0																			
4.2	14.0	14.0	13.5	13.0	12.0	11.0	10.5	9.5	8.5	7.5	5.5	4.0	2.0	0.5																		
4.4	14.0	14.0	13.5	13.0	12.5	11.5	11.0	10.0	9.0	8.0	7.0	5.5	4.0	2.0	0.5																	
4.6	14.0	14.0	13.5	13.0	12.5	12.0	11.5	11.0	10.0	9.0	8.0	7.0	5.0	4.0	2.0	0.5																
4.3	14.0	14.0	13.5	13.0	13.0	12.5	12.0	11.0	10.5	10.0	9.0	8.0	7.0	5.5	4.0	2.5	1.0															
5.0	14.0	14.0	13.5	13.5	13.0	12.5	12.0	11.5	11.0	10.5	9.5	9.0	8.0	7.0	5.5	4.0	3.0	1.5	0.0													
5.2	14.0	14.0	13.5	13.5	13.0	12.5	12.0	12.0	11.5	11.0	10.0	9.5	8.5	8.0	7.0	5.5	4.5	3.5	2.0	0.5												
5.4	14.0	14.0	13.5	13.5	13.0	13.0	12.5	12.0	11.5	11.0	10.5	10.0	9.0	8.5	8.0	6.5	5.5	4.5	3.5	2.5	1.0	0.0										
5.6	14.0	14.0	14.0	13.5	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.0	8.5	7.5	7.0	6.0	5.0	4.0	3.0	2.0	1.0									
5.3	14.0	14.0	14.0	13.5	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.0	6.0	5.0	4.0	3.5	2.5	1.5	0.5							
6.0	14.0	14.0	14.0	13.5	13.0	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.0	6.0	5.5	4.5	3.5	3.0	2.0	1.0	0.0					
6.2	14.0	14.0	14.0	14.0	13.5	13.0	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.0	6.5	6.0	5.0	4.0	3.5	2.5	2.0	1.0	0.5			
6.4	14.0	14.0	14.0	14.0	13.5	13.0	13.0	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.5	9.0	8.5	8.0	7.5	7.0	6.0	5.5	5.0	4.0	3.5	2.5	2.0	1.0	0.5	
6.5	14.0	14.0	14.0	14.0	13.5	13.0	13.0	13.0	13.0	12.5	12.0	12.0	11.5	11.0	10.5	10.0	9.5	9.0	9.0	8.5	8.0	7.5	6.5	6.0	5.5	4.5	4.0	3.0	2.5	2.0	1.0	0.5

TABLE II

RELATIONSHIP BETWEEN CARBON AND HARDNESS OF 50 PCT MARTENSITE (Determined from Fig. 3)

Pct Carbon	Rc	Pct Carbon	Rc	Pct Carbon	Rc
0.15	28.5	0.30	37.5	0.45	45.5
0.16	29.0	0.31	38.0	0.46	46.0
0.17	30.0	0.32	38.5	0.47	46.0
0.18	30.5	0.33	39.0	0.48	46.5
0.19	31.0	0.34	40.0	0.49	47.0
0.20	31.5	0.35	40.5	0.50	47.5
0.21	32.0	0.36	41.0	0.51	48.0
0.22	32.5	0.37	41.5	0.52	48.5
0.23	33.5	0.38	42.0	0.53	48.5
0.24	34.0	0.39	42.5	0.54	49.0
0.25	34.5	0.40	43.0	0.55	49.0
0.26	35.0	0.41	43.5	0.56	49.5
0.27	36.0	0.42	44.0	0.57	50.0
0.28	36.5	0.43	44.5	0.58	50.0
0.29	37.0	0.44	45.0	0.59	50.5
				0.60	51.0

steels tested were AISI types 1000, 1300, 3100, 4100, 4300, 4600, 4800, 5100, 8600, and 9400 with a carbon range of 0.15 to 0.60 pct and a D_I range of 1.0 to 6.5 in. In these tests, the D_I values used in estimating end-quench hardness were determined from actual end-quench hardness by converting into D_I values the distances at which 50 pct martensite hardness occurred.

Chief limitations of the proposed method are briefly the following. Recent work has indicated that for boron steels the relationship between hardenability and microstructure differs from that shown in Fig. 3, therefore, the proposed method does not apply to such steels. If 50 pct martensite hardenability, D_I, is determined from chemical composition, errors inherent in certain of these calculations will be carried over into the final estimation of the end-quench-hardness curve.

SHORTCUT

1. Determine from Table II the 50 pct martensite hardness corresponding to the carbon content.
2. Determine from Table I the hardness increments at each 1/16-in. distance along the end-quench bar for the known D_I.
3. Add each of these increments to the hardness determined in step 1.
4. Plot the curve from the hardness values determined in step 3.

Acknowledgment

The authors wish to express their appreciation to Dr. M. W. Hawkes of Carnegie Institute of Technology for his assistance during the time that this investigation was being conducted.

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(1) J. M. Hodge and M. A. Orehoski, "Relationship Between Hardenability and Percentage of Martensite in Some Low Alloy Steels," Metals Technology, Sept., 1946.

(2) Joseph Field, "Calculations of End-Quench Hardenability from Chemical Compositions," Metal Progress, Mar., 1943.

(3) J. M. Hodge and M. A. Orehoski, "Hardenability Effects in Relation to the Percentage of Martensite," AIME Technical Publication 1944.

NEW BOOKS

"The Manual of Corporate Giving," Beardsley Ruml, editor. Presents practical do's and don'ts for use in planning business contributions under the 5 pct tax exemption privilege of the Internal Revenue Code. The manual answers the question of how to achieve maximum benefits—to both the donor and recipient —from money contributed to educational, scientific, and welfare activities. Prepared in collaboration with Theodore Geiger. National Planning Assn., 800 21st St., N.W., Washington 6, D. C. 398 p. $6.75.

"Basic Engineering Metallurgy," by Carl A. Keyser. Students in all branches of engineering will find this book of interest. General metallurgical information of interest to engineers specializing in materials and methods is also presented. The first six chapters present a theoretical approach to the subject. Other chapters discuss properties, heat treatment, a discussion of properties, applications and fabrication techniques. Prentice-Hall, Inc., 70 Fifth Ave., New York 11, N. Y. 384 p. $8.00.

"Share Ownership in the United States," by Lewis H. Kimmel. How many people own shares in the nation's business? Recently the New York Stock Exchange asked the Brookings Institution for the answer to this and other questions relating to stock ownership. Brookings produced a comprehensive report. About 6½ million shareowners hold 30.3 million shares of stock. Men own better than four shares for every three held by women. About 45 pct of administration executives are shareowners. The Brookings Institution, Washington 6, D. C. $1.50. 140 p.

"Effects of Taxation—Depreciation Adjustments for Price Changes," by E. Cary Brown. Deals with the problem of adjusting for the gap between historical costs and replacement costs of capital assets in measuring depreciation and business income. Appraises proposals to modify the tax law to allow depreciation deductions to be calculated on replacement cost. Division of Research, Harvard Business School, Soldier's Field, Boston 63, Mass. $3.25. 161 p.

Good for intricate shapes—

CRUSH GRINDING Makes Accurate Broaches

by H. H. Gotberg
Vice President, Engineering
Colonial Broach Co.
Detroit

Crush grinding techniques developed over the last 10 years permit making quantities of broaches with identical accuracy. Small intricate shapes can be produced by modern crush grinding techniques. Accuracy of 0.0002 in. is not unusual. Quantities of 6 or more usually are enough to justify expense of making master and crushing roll.

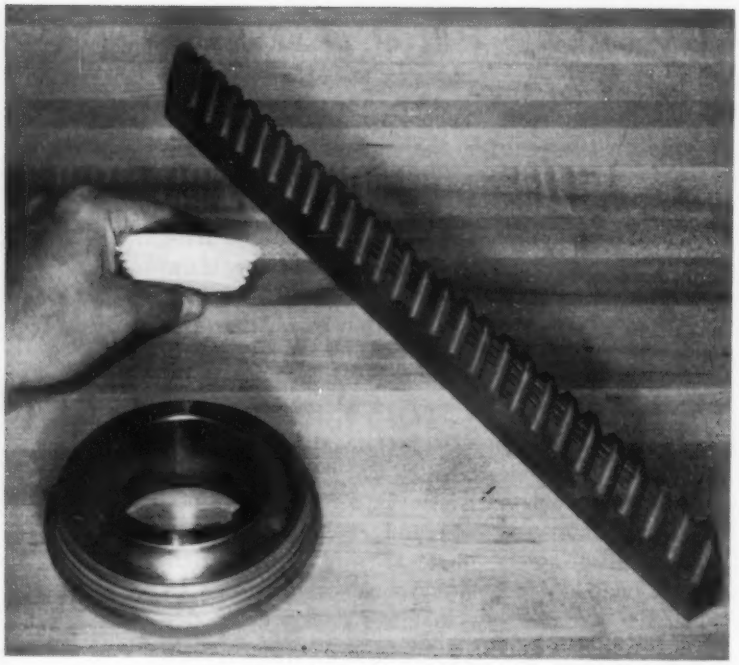

FIG. 1—Broach used to form slots to hold blades in jet engine turbine disc. Grinding wheel used is held in center. Hard roll used to crush form into the wheel is at bottom.

Application of crush grinding techniques to the production of surface broaches permits quantity manufacture of extremely accurate tools that will produce intricate shapes.

A major advantage of using crush grinding methods is the ability to produce quantities of broaches with identical accuracy. Once a master form tool has been produced to the required accuracy, this form can be faithfully reproduced over and over again on the cutting surfaces of quantities of broaches.

Military and peacetime product designers are continually specifying more and more intricate shapes that can economically be produced only by the broaching process. Crush grinding techniques have enabled broach manufacturers to produce tools that will produce these intricate shapes with an amazing degree of accuracy.

A 0.003-in. radius can be easily produced on a grinding wheel by crushing techniques. Many intricate shapes specified today are extremely small in size and require small diameter grinding wheels to back off broach cutting surfaces. A wheel as small as ⅜-in. diam can be formed by crushing methods.

Surface broaches produced by crush grinding

methods are smooth and have an excellent finish. The grinding wheel abrasive surface as crushed is sharp and hard, producing smooth high finish surfaces. Smooth surfaces on broaches improve performance and increase tool life. Another reason that surfaces produced by crush formed wheels are smooth is that fine grit wheels can be shaped.

Crush forming of grinding wheels that will produce surfaces of the accuracy and finish required in surface broaches has been a gradual development over the last ten years. And there is still a long way to go before maximum advantage has been taken of the method.

Three main steps are required to produce a given shape in a grinding wheel. First a precision hardened master form tool is produced. This is made to exacting tolerances and checked on a projector against a master layout of the desired shape.

Next a high strength cast iron crushing roll is machined with the master form tool. Special equipment and techniques assure absolute duplication of the tool form in the iron master.

In the final step the grinding wheel is formed in position on the spindle of the surface grinder by the crushing roll. The wheel is recrushed when necessary to maintain tolerance specifications.

The crushing roll is remachined when work accuracy indicates that the form produced in the wheel is outside the working tolerances. The master form tool, grinding wheel, and the resulting surface broach for slots in jet engine rotors are shown in Fig. 1.

In general if six inserts or duplicate surfaces are required for a production setup, the expense of making a form tool and utilizing crush grinding techniques is justified. In many cases complicated surfaces will warrant crush grinding for smaller quantities.

All the shapes shown in Fig. 2 have been produced in surface broaches by crush grinding. Accuracy of 0.0002-in. is usual even for shapes as intricate as those shown.

One interesting example of application of crush grinding methods to a close tolerance surface broach is one made recently for the Detroit Arsenal. Here a Colonial Broach vertical broaching machine produces 294 teeth of 4 diametral pitch on a 6 ft dia tank turret ring gear in 30 min. Specifications called for tooth spacing of 0.001 in. and eccentricity of 0.0005-in. per in. of diameter. The surface broach on this application has 11 teeth and is made up of a series of segments.

The pitch diameter of the involute gear teeth on the broach of course has the curvature of the ring gear. The individual segments for this broach are ground by specially developed crush forming techniques. Fig. 3 shows the grinding operation on one segment.

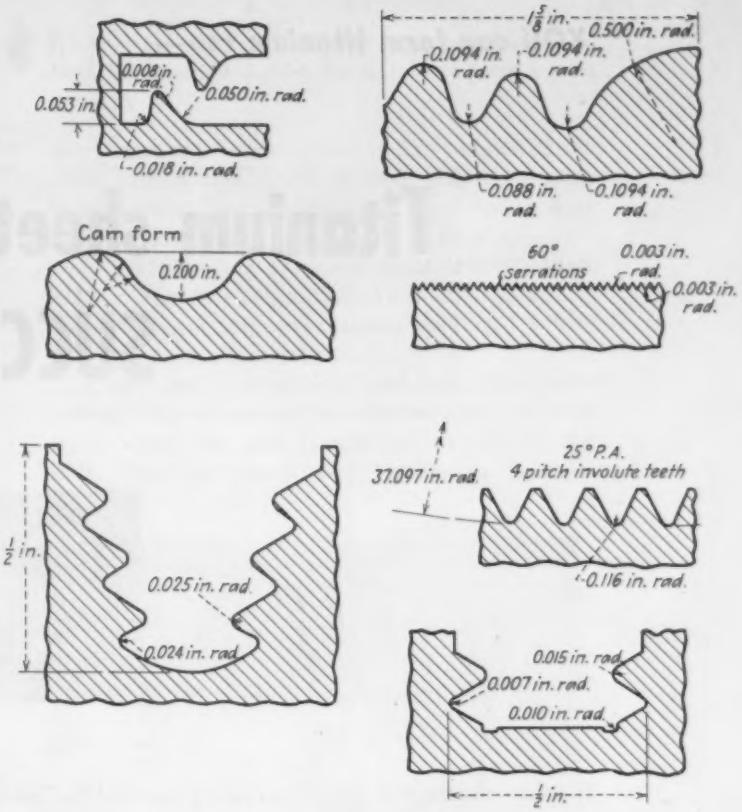

FIG. 2—A variety of intricate accurate shapes all of which can be broached with broaches ground by crush-formed wheels. Grinding wheel is formed on grinder spindle.

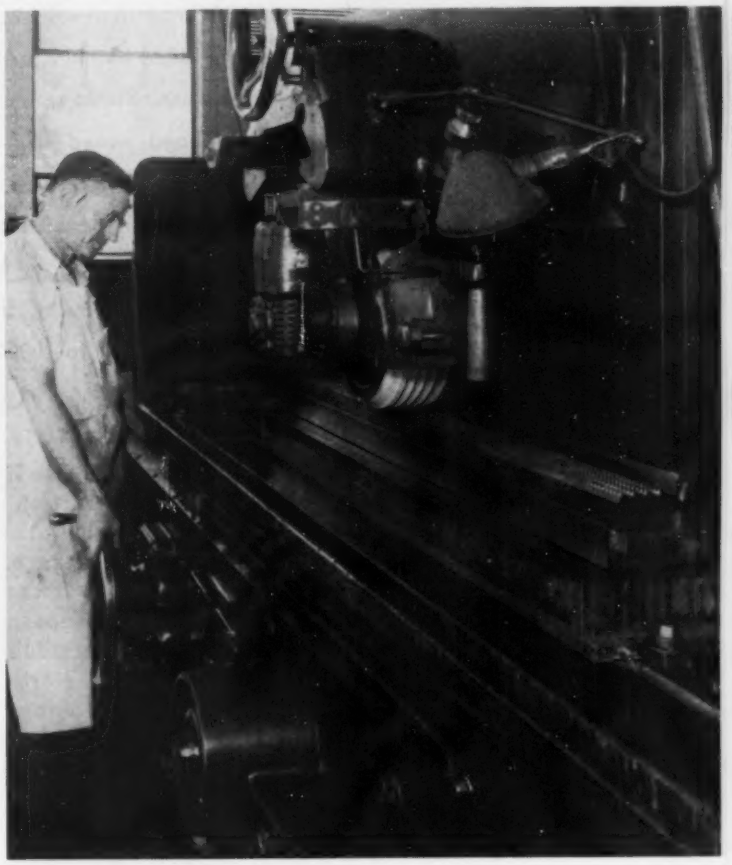

FIG. 3—Crush grinding segments for a broach used to cut the teeth in a large-diameter tank turret ring gear.

YOU can form titanium too—

Titanium sheetmetal parts SUCCESSFULLY MADE

By Andrew N. Eshman
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Titanium sheetmetal parts are being successfully fabricated at North American Aviation, Inc. Typical parts are webs, channels, frames, shrouds and angles. Used in the aft fuselage section where operating temperatures do not exceed 800°F, titanium parts are replacing stainless steel with important weight savings. Commercially pure RC-70 and RC-130A titanium alloy were used to establish fabrication techniques. Blanks for hydraulic and punch press parts have been band sawed at 1700 to 1800 fpm, 24 teeth per inch. High speed cobalt type drills, ground as for stainless steel, and running at 40 to 50 sfpm were most effective in drilling. Heat was used in forming, on both hydraulic and punch presses, with best results, costwise, from hydraulic forming. Good parts were formed at 800° to 1000°F.

Titanium possesses characteristics that give it a promising future in aircraft construction. Among these are its high strength-weight ratio up to 800°F and excellent corrosion resistance. Largest single factor influencing its use is the saving of weight. This is of prime importance in aircraft as 1 lb of weight saved is 1 lb of additional fuel capacity. For example, on one North American airplane the potential weight savings derived from the use of titanium might feasibly extend the range of that airplane by 150 miles.

Currently, North American design includes the use of titanium in the aft fuselage section of one airplane. In this zone, engineers previously specified stainless steel as certain structures required more strength than aluminum alloys could supply at elevated temperatures. Above 300°F, the strength of aluminum is not sufficient for structural components. Typical parts in this section are webs, channels, frames, shrouds, angles and stiffeners made from ¼ or ½ hard stainless steel. Titanium was limited to any structural application where the operating temperature does not exceed 800°F.

Preliminary fabrication tests were made to determine production difficulties and to establish fabrication techniques. The material used was RC-70, commercially-pure titanium, and RC-130A, alloy titanium, both produced by Rem-Cru Titanium, Inc.

Bend tests were conducted on both RC-70 and RC-130A. From these tests a minimum bend

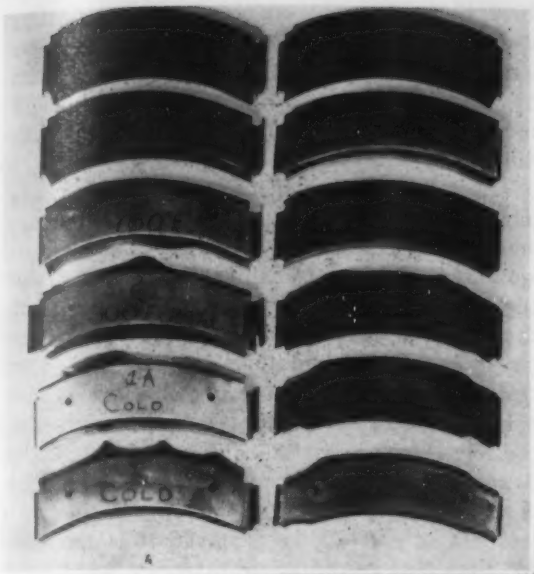

FIG. 1—Parts made on hydraulic press used steel form block, had stretch and shrink flange, radii of 5 and 6½ in.

die alignment, were drilled in the blanks. High speed cobalt type drills, ground slightly flatter than normal, as for stainless steel, were employed. Lower drilling speeds giving approximately 40-50 sfpm produced better results than higher speeds. Tests indicated any standard water soluble lubricant would cool and lubricate the drill effectively.

In drilling, a constant feed must be maintained. This prevents the adverse effect of cold work when the drill is allowed to ride in the hole. Titanium drills very similar to ¼ hard

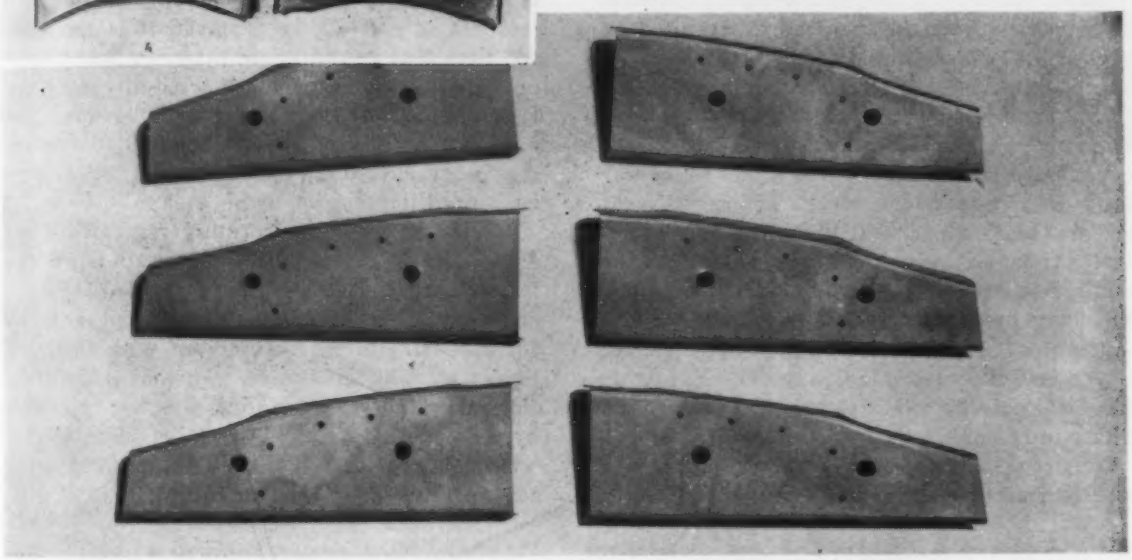

FIG. 2—Hot handwork was needed to remove wrinkles from parts formed on Hydropress. Parts were held at 1100°F for 15 min to complete annealing, remove cold work effects.

radius of three times the sheet thickness was established. Critical bend direction was found to be that in which the axis of the bend was parallel to the direction of rolling.

Information previously obtained on forming titanium had indicated the need for use of heat. With this in mind, steel was used for all hydraulic press and punch press tooling. This enabled heat to be utilized in press forming and in subsequent handwork.

In preparation for hydraulic press and punch press parts, blanks were cut on a band saw from RC-70 and RC-130A sheet. Sheet thicknesses ranged from 0.016 to 0.081 in. Several types of band saw blades were tried as well as a variation of saw speeds. The best combination found was the same type blade used to saw stainless steel (24 teeth per inch) and a saw speed of 1700 to 1800 fpm. Blanks were deburred by hand. In general, RC-130A is more difficult to saw than RC-70.

Tool holes ¼ in. in diam for form block and

FIG. 3—Punch press parts were formed on internally heated die. High temperature lubricant prevented galling.

"Severity of the part contour will determine if . . . use of hot forming is essential . . . "

stainless steel except that lower drill speeds should be used.

Parts fabricated on a hydraulic-press used a steel form block. Parts produced by this block, Fig. 1, had a stretch and shrink flange with radii, respectively, of 5 and 6½ in. Bend radius for both flanges was ⅛ in. A press pressure of 1475 psi was used with an enclosed rubber pad of 55 durometer hardness. Prior to hot forming, several parts of gage thicknesses 0.016, 0.024, and 0.030 in., were formed cold. These parts wrinkled excessively and all attempts to remove the wrinkles by cold hand work resulted in cracks. The average springback on the RC-70 parts was 14°, on the RC-130A parts, 16°.

First experimental hydraulic-press parts were not made on an internally heated form die for economic reasons. Heating was accomplished by using an oxy-acetylene torch. Temperature of the form block was checked by a contact pyrometer. After the form block was heated to the required temperature, the blank was positioned and heated to a corresponding temperature. As titanium changes color on heating, it served as its own temperature indicator. The blank was then covered with asbestos sheet to protect the rubber in the press.

Numerous parts of varying gage thicknesses were formed at a temperature range of 300° to 1000°F. Good parts were obtained when forming was accomplished at 800° to 1000°F. At these temperatures, average springback for RC-70 was 5°, for RC-130A, 9°. Hot handwork at 400°F removed press formed wrinkles with little difficulty.

The steel form block used for the preceding parts was modified to include the following: Joggles of ⅛ in. and 3/16 in. depth on opposite ends of the block; a bead on the top surface of the block; a 5° springback allowance on both the shrink and stretch flange sides. The hydraulic press used was equipped with a 20 in. diam trap which enabled a forming pressure of 2550 psi to be used. Several parts were formed with the form block and blanks heated to 800°F. The full joggle depths were not obtained and the bead impression was very faint.

A rubber pad of greater hardness (Durometer 65) than that contained in the press was placed on top of the asbestos sheet. With this setup the full joggle depths were obtained; however, the bead was not formed to full depth. It appears that a pressure plate to localize the pressure on such bead impressions is necessary.

Deviation from hot forming for certain hydraulic press parts was successful when the following cycle was employed: partial form operation, an intermediate anneal and a finish form operation. In conjunction with this, hot handwork was necessary to remove the press formed wrinkles. Annealing was accomplished by holding the part at 1100°F for 15 min. This treatment completely removed all cold work effects introduced by forming.

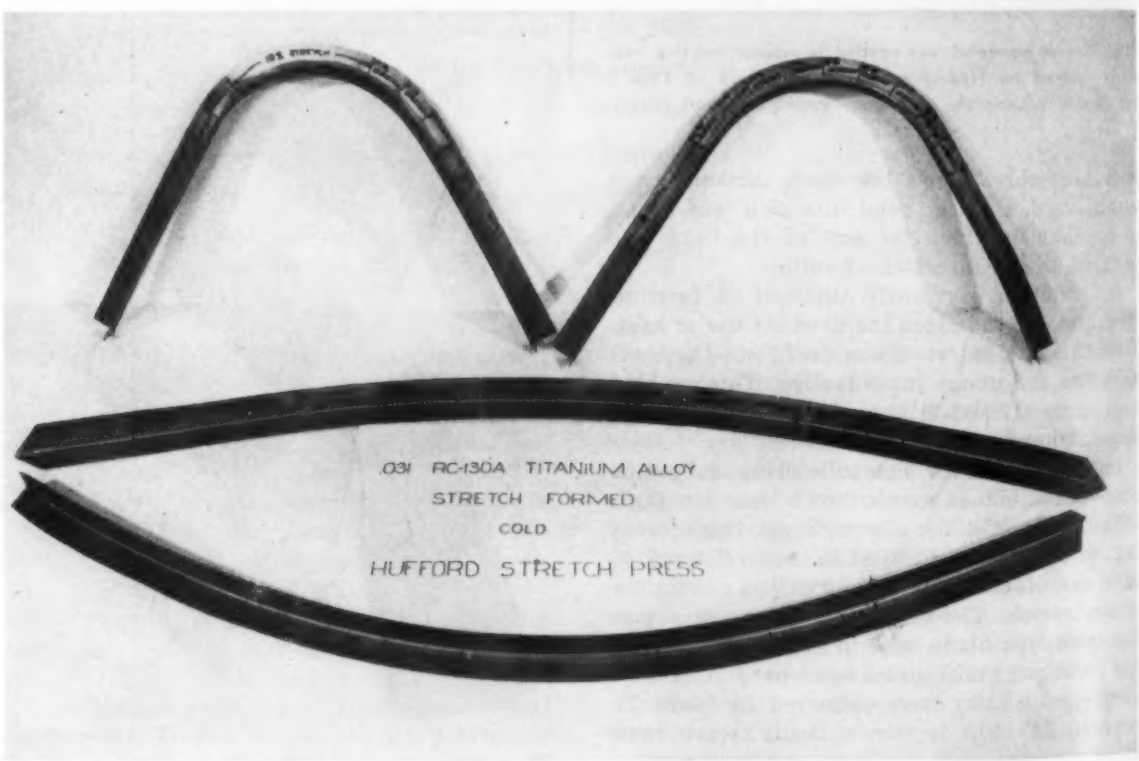

FIG. 4—Hufford stretch press was used to cold form these parts from 0.031 in RC-130A titanium alloy.

Parts formed in the above manner are illustrated in Fig. 2. These parts had one straight flange and one shrink flange with joggles of 0.125 in. and 0.040 in. on opposite ends.

An evaluation of hydraulic press forming indicates that the severity of the part contour will determine if the use of hot forming is essential. If the part is formed cold, an intermediate anneal will probably be necessary, followed by a finish form operation and hot handwork. For either hot or cold forming, a harder rubber pad than the press contained rubber should be utilized. Generally, for hot forming operations, RC-130A requires slightly higher forming temperatures and pressures, plus additional springback allowance, than a corresponding gage of RC-70.

Formed on internally heated die

Punch press parts of 0.030 in. RC-130A were formed on an internally heated die. These parts, Fig. 3, had joggle depths of 0.125 in. and 0.040 in. on opposite ends. To prevent galling of the part against the steel die, a high temperature lubricant was used. Numerous parts were formed at temperatures ranging from room to 800°F. At the latter temperature, the male punch had expanded to the extent that it lodged in the female die. Springback on the parts varied between 9° and 15°, depending upon the forming temperature and press speed. Hot handwork after forming was necessary on all parts.

The quality of punch press parts as compared to the hydraulic press parts does not warrant the more expensive tooling costs. In punch press tool design the expansion of the steel die at 800° to 1000°F must be considered. Except for large production orders, punch press forming is not recommended.

For stretch forming several 1½ in. strips of 0.030 in. RC-130A were sheared and angled to a 3t radius on a press brake. Three stretch dies were used. Two of these produced parts with a ¾ in. stretch flange around radii respectively of 21 in. and 3½ in. Parts formed from the other die had a ¾ in. shrink flange around a radius of 21 in., Fig. 4. In the 21 in. radius die, springback of ¼ in. on each side was allowed.

Stretching was accomplished on a 17-ton Hufford hydraulic stretcher with standard jaw inserts. To prevent slippage in the jaws, garnet cloth was placed on the strip grip ends.

The first part was stretched by applying an initial wrap tension just under the yield point of the material. This tension was then slowly increased during wrapping to effect plastic flow within the material. Increasing the tension during wrapping propagated a fracture in the flange radius. Subsequent parts were successfully stretched by applying sufficient load to effect plastic flow and by maintaining this load during wrapping. A load of 5100 lb was applied producing a wrap tension of 111,000 psi. The springback allowance of ¼ in. on each of the 21-in. radius die parts was not sufficient. Attempts to mechanically shrink these parts to conform to templet dimensions were unsuccessful. Stretching percentages varied from 2 to 20 pct.

FIG. 5—Router bit cooled by liquid CO_2 successfully routed titanium blanks. Linear travel was 15 ipm.

Summarizing the stretch forming tests leads to the following recommendations: Accurate springback allowance should be made in the design of stretch dies; initial loads, in stretching, should be sufficient to effect plastic flow within the material. This load should not be increased during wrapping.

Routed with CO_2 coolant

In addition to the various fabrication tests, experimental routing of RC-130A was attempted. Routing serves as a means of cutting sheet metal blanks that cannot be sheared due to the nature of their contour. This method, at present, is not adaptable to steel. Consequently, it would not be suitable for titanium unless some means were employed to cool the router bit.

In the experiment conducted liquid CO_2 was used as a coolant on a pin router, Fig. 5. A 3/16-in., five-fluted carbide router bit was employed. The source of the CO_2 was a fire extinguisher fitted with copper tubing and a 0.013-in. orifice diam nozzle. With this setup a 0.030-in. RC-130A blank was routed successfully using a router speed of 10,000 rpm. The linear travel was approximately 15 ipm. Improvements in nozzle design and router bits would speed up the operation. These initial routing tests were very encouraging. If this method is developed for tianium, it would easily be adaptable to steel.

Ram coin dimpling was accomplished on a Chicago Pneumatic 450EA Stationary Squeezer equipped with heat and timing controls. A standard punch and die normally used for 75S was employed. With this equipment, numerous ⅛ in. dimples were made in 0.030 in. RC-130A.

British weigh various methods—

Is Pre-openhearth Desulfurization PRACTICAL?

By C. E. A. Shanahan
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British studies of refining treatments, both before and after the openhearth, indicate that manganese, phosphorus, and silicon can be better removed in the mixer if there is increased agitation. Desulfurizing might be done in the teeming ladle with magnesium aluminum alloys. Desulfurizing in the mixer may be promoted by increasing the manganese content of the blast furnace metal, and by increased mixing action. Reducing sulfurizing too low before the openhearth leads to increased pickup from fuel.

Apart from slag flushing, there are only two practical means of avoiding an increase in open-hearth slag bulk, and at the same time coping with a general increase in metallurgical load. One way is to remove some of the metalloids from the blast furnace metal prior to the openhearth furnace. The other is to continue refining the steel after the openhearth treatment. The latter methods, such as the Perrin technique, require that the metal be poured through a separately melted slag from a considerable height. This has obvious disadvantages with large metal tonnages.

In concentrating on pre-openhearth refining treatments study has been made of mixer data from several plants. The general variability of the data made it difficult to draw conclusions. But there was a connection found between the oxygen equivalent of silicon, manganese and phosphorus removed, and the weight of lime added during the same period. There was also a connection between oxygen equivalent of silicon, manganese, and phosphorus removed and the number of disturbances occurring within the mixer during the same period.

This suggests that in some mixers increased amounts of manganese, phosphorus and silicon could be removed in a given time by increasing the amount of agitation of slag and metal. Some preliminary experiments have been undertaken by one firm using air lances. Although there was a slight increase in metalloid removal, the results were inconclusive because of the occurrence of other changes not controllable.

Removal of sulfur in the openhearth furnace, while often adequate for high carbon steel production, is a very serious problem for low carbon steel manufacture, especially deep drawing steel. Canadian workers recently performed some small scale trials on desulfurizing molten steel with magnesium aluminum alloys. This process might be applied to large tonnages of steel in the teeming ladle where very low final oxygen contents are permissible.

The pre-openhearth desulfurization of blast furnace metal is commendable. The high carbon content of the metal is conducive to high sulfur partitions and therefore to slag and heat conservation. It also results in the sulfur becoming more chemically active and more easily removed by basic slags. Also, the relatively low temperature of blast furnace metal and the high manganese content could under certain conditions result in the loss of sulfur from the metal by manganese sulfide flotation.

Data from seven mixers

Data obtained from seven mixers, four active and three inactive, are shown in the accompanying box. In all cases but two the amount of desulfurization was small. In one of these it appeared that desulfurization occurred rather by the separation of manganese sulfide than by the exchange of sulfur atoms in the metal with oxygen atoms in the slag. The situation was complicated by sodium oxide in the slag.

The latter mechanism was considered to predominate in the remaining mixers, favored by highly basic slag and low iron oxide content. The second mixer in which desulfurization occurred is a good illustration. In this case desulfurization efficiency was produced by the feeding of lime only. There was a tendency for sulfur to be removed from the bath by the waste gases, and although a particular slag might have a very low sulfur partition, important losses of sulfur might occur to the atmosphere.

The loss of sulfur by manganese sulfide separation could probably be used to greater effect in practice. This would involve increasing the manganese content of the blast furnace metal in some way such as addition of ferro-manganese or manganese oxide, and operating the

mixer at as low a temperature as possible. To desulfurize to any extent without the manganese reaction requires a highly basic slag and a very low iron oxide content. But these conditions are of no value for desiliconization which is essentially an oxidation reaction.

Another possible practical proposition is that a means of further desulfurizing blast furnace metal would be to prolong the time of contact between metal slag and avoid large temperature drops. The fact that blast furnace slags are not in equilibrium with the metal has been shown in work by Hatch and Chipman, and by Darken and Filer.

Work by British Iron & Steel Research Assn. at Sheffield has been on desulfurization of carbon-saturated iron by blast furnace-type slags. Preliminary studies were mainly concerned with the effect of mixing on the rate of desulfurization.

Generally, blast furnace or similar slags should be capable of rapidly desulfurizing blast furnace metal providing highly reducing conditions and temperature can be maintained, and that some means is available for intimately mixing the slag and metal. A carbon lined cylindrical furnace heated by a carbon rod resistor has been built which has a carbon wedge longitudinally along the bottom of the melting chamber. It has a 10-lb capacity. The furnace can be rocked so that slag and metal continually cascade over the wedge. It is intended to use this furnace for desulfurizing carbon-saturated iron with blast furnace slags, and with lime alumina non-siliceous slags. It is also intended to try other types of stirring furnaces such as a cylindrical vessel, with a number of wedges or other obstructions, which could be oscillated or rotated.

Blast furnace type slags have been desulfurized by blowing with air through a silica lance to see if their efficiency in removing sulfur from the metal could be enhanced. The rates of desulfurization were quite high and can theoretically be made considerably higher for the same air flow by more intimate mixing. This process could in practice only profitably be performed in the absence of the molten metal. The fact that passage of cold gas through the melt results in considerable cooling might be partially overcome by the use of preheated air or the introduction of a fuel such as blast furnace gas or carbon into the air stream.

A possible development of post blast furnace desulfurization of molten iron might be (1) Blast furnace slag poured into a carbon lined reaction vessel and partially desulfurized by air-fuel blow. (2) Molten iron poured into the slag and desulfurized by agitation. (3) Slag regenerated by a second air-fuel blow after separation of the iron.

An investigation is being made into the possibility of producing a liquid slag very rich in calcium carbide, which would be a very potent desulfurizer. No experimental data are yet available.

DESULFURIZATION IN MIXERS

Mixer	Type	Sulfur, Weighted Average, Pct		Desulfurization Efficiency, Pct	Weighted Product, Pct Mn × Pct S	Solubility Product, Pct Mn × Pct S	Sulfur to Atmosphere, Pct	
		In	Out					
1	Active	0.053	0.047	11.3	0.039	0.105	15	Lime + ore added
2	Active	0.090	0.083	7.8	0.066	0.113	nil	Lime + ore added
3	Active	0.084	0.077	8.3	0.061	0.097	nil	Limestone + ore added
4	Active	0.048	0.026	45.8	0.059	0.170	98.7	Lime added
5	Inactive	0.067	0.063	6.0	0.053	0.056	82.0	Small amount lime added
6	Inactive	0.070	0.069	1.4	0.055	0.095	46.0	No oxides added
7	Inactive	0.116	0.086	25.9	0.084	0.045	42.0	Slag contains Na_2O

It has been suggested that desulfurization of hot metal presents no problem but the elimination of silicon and phosphorus does. In the openhearth furnace, sulfur from pig iron accounts for only 23 or 24 pct of the sulfur in the system, the remainder coming from the fuel and other additions. There seems to be a value below which there is little point in reducing the sulfur before the openhearth process, since extremely low sulfur iron appears to take up sulfur more readily from the fuel. Nevertheless, the special desulfurizing processes, such as the Kalling and Heuer, could prove very valuable. They could be used to reduce a portion of the molten iron to very low sulfur content and thus by dilution give a reasonably low average sulfur content.

It is also suggested that it might be more economical to remove phosphorus from the molten iron before supplying to the openhearth. But molten iron containing considerable carbon has very little oxygen potential available for appreciable oxidation of phosphorus. Chemical considerations show that phosphorus removal is more effectively carried out in openhearth where the carbon content of the iron has been oxidized to a lower level and the temperatures are higher.

This article is based on the author's paper at the 38th Annual British Steelmaking Conference.

How does YOUR paint stick?—

Phosphoric acid treatment improves PAINT ADHERENCE, CORROSION RESISTANCE

By W. G. Patton
Asst. Tech. Editor

Improved corrosion resistance and better paint adherence on metal parts subject to much moisture are possible with proper pre-paint treatment. Temprite Products Corp., Birmingham, Mich., has the enviable record of 5 yr of volume production without a reject for faulty paint adhesion in service. Temprite uses Nielizing. A phosphoric acid surface conditioner cleans steel parts at 180°F in 2 to 3 min. This is followed by a hot water rinse for zinc-coated steel. Uncoated steel parts receive an additional dip in a fixing solution to neutralize metal surface. The installation occupies a minimum floor space and a large volume of metal can be treated each day. Total unit cost of preparation for all metal parts has averaged 0.032¢.

More than 5 years of volume production without a single reject for a faulty paint job or lack of paint adhesion in service is the unusual record of Temprite Products Corp., Birmingham, Mich. The company manufactures water coolers, dental x-ray processing units, photographic developing and similar equipment.

In manufacture of equipment constantly exposed to moisture, optimum resistance to corrosion and good surface finish are second only to sound engineering and mechanical reliability.

Temprite's requirements for surface cleaning and paint preparation were not easily met. The company uses both hot and cold-rolled mild steel sheet and strip in the production of frames, Fig. 1, panels and other parts of its coolers. For prominent outside panels not made of stainless steel, zinc-coated steel is specified.

It was desirable to select a metal surface conditioning treatment for non-stainless parts that (1) occupied minimum floor space, (2) could be used for both uncoated and zinc-coated carbon steel, (3) required minimum chemical makeup, (4) permitted parts to stand over week-ends and holidays without corroding, (5) provides a clean surface to which paint bonds readily and securely.

Previously, Temprite used an alkaline cleaning method, followed by a water rinse. Experience in service showed that any improvement in

corrosion resistance that could be applied at low cost would undoubtedly be reflected in greater customer satisfaction.

After an extensive search, the Nielizing process for corrosion control, produced by Nielco Laboratories, Detroit, was selected by Temprite for its metal surface conditioning.

The installation requires a minimum of floor space. Three dip tanks occupy an area only 4 x 16 ft. Tanks are 42 x 48 x 54 in. As shown in Fig. 1, there are separate tanks for (1) acid treatment, (2) hot water rinse, (3) fixing solution (for mild, uncoated steel only.)

The Nielizing process uses an acid surface conditioner, made from a phosphoric acid base, to clean ferrous metals and condition them for painting. Temperature of each of the steam heated baths is held at 180°F. Fig. 2 shows a load of zinc-coated steel panels being lowered into the cleaning and etching bath.

Normal time in the acid bath is 2 to 3 min. However, if steel is badly rusted, the work may remain in the cleaning bath as long as 10 min. The solution removes soil, rust and light oil. Materials coated with heavy oil or drawing compounds are first treated with a vapor solvent.

Each tank has a capacity of 400 gal. Ph of the phosphate bath is maintained at 7.8 but may safely range from 7.4 to 8.0. Approximately 75 gal of liquid Nielite 983 is charged initially into the acid cleaning tank, together with 325 gal of water. The amount of makeup depends on the volume of work and must be determined by the amount of etching required.

In the process there are no soluble iron phosphates to weaken the acid. Insoluble iron phosphates settle out at the bottom of the tank and can be filtered out. There are no harmful fumes given off. Light oil floats on the surface of the cleaning bath and is readily dipped off by the operator.

Following the phosphoric acid treatment, parts made of zinc-coated steel are rinsed in acid-free water at 180°F. The parts are then air dryed and taken to painting booths for spraying and drying in an infra-red oven at 275°F.

FIG. 1—Hot and cold-rolled sheet and strip are used in refrigerator frames of water coolers shown at assembly.

FIG. 2—Degreasing, etching and fixing of panels and other parts clean and prepare metal surfaces for painting.

Uncoated, mild steel frames, panels and braces and other parts are given an additional dip in a fixing solution to neutralize the surface of the metal. The solution is made up by adding 12 lb of a prepared fix to the 400 gal tank as the initial charge. Makeup for this tank averages approximately 1-lb per week at normal production rates. A 15 to 30 sec immersion is all that is required.

This operation is followed by an air dry with a hose for light metal parts. Heavy gage metal and forgings are self-drying.

An advantage claimed for the process is that it not only cleans the surface but deactivates it against corrosion. Metals treated by this process have withstood atmospheric corrosion for 2 years. A large volume of metal can be treated per day in a comparatively small floor space. In Fig. 2, 12 side panels weighing 8 lb each are being treated. For these zinc-coated panels, the cycle time is less than 1½ min.

Metal conditioning costs at Temprite have been unusually low. Total cost of preparation for all metal parts has averaged 0.032 per unit.

Are your men in a sump?—

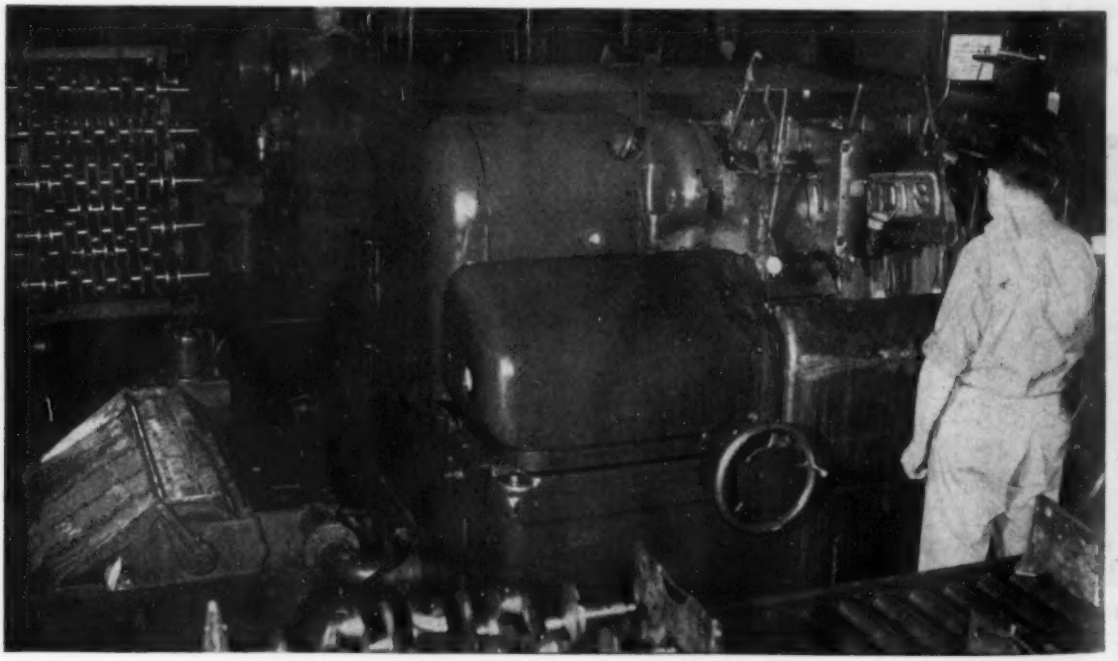
MAGNETIC CHIP SEPARATION Pays Off

By Jules V. Caldwell
Asst. Mechanical Engineer
International Harvester Co.
Indianapolis

International Harvester's Indianapolis plant uses magnetic chip separators on grinders, hones, gear shavers, and tapping machines. Biggest savings come from reduced downtime for cleaning out coolant tanks. Often there are other benefits, such as lowered coolant cost, increased tool life, better surface finish, and ability to maintain closer tolerances.

Magnetic separators have been found to be very successful at the Indianapolis Works of International Harvester Co. This large motor truck engine plant has more than 75 units installed on various types of machine tools, including grinders, hones, gear shavers and tapping machines. The biggest savings from these units come from the time and coolant saved by reducing the necessity to shut down machines to clean out the coolant reservoirs. In many

FIVE-WHEEL GRINDER utilizes a 100-gpm magnetic chip separator. Job is grinding 3 main bearing diameters, a flange OD and a pulley fit diameter. Machine needs cleaning only once a year. And more pieces per wheel dressing are obtained than was the case before chip separation was employed. Coolant sump and reservoir are under floor.



TWO-STATION reaming machine used to require cleaning out of chips about 4 times an hour, a messy job requiring man to crawl under conveyor with a rake. Now coolant flood washes chips to separater. Hand cleaning is seldom used.

cases there are other advantages such as increased tool life, increased surface finish and ability to maintain closer tolerances.

On machines where coolant separators have not been installed it takes two men an average of two hours to clean out a machine. This is usually required at least every three weeks. The machine has to be shut down and the coolant replaced, thereby creating a loss of production and coolant. On machines where separators are installed and an oil base coolant is used, it is only necessary to clean out the machines and replace the coolant once a year.

Less loading, less dressing

On grinders, for example, the container into which the separator discharges the grinding sludge is emptied every day, or as required, but does not necessitate shutting down the machine nor replacing the coolant. By using separators on these machines, there is less loading of the wheel and less dressing is required, thereby increasing the life of the grinding wheels. Records show that on one grinder, without a separator, 14 crankshafts were produced per dressing. With a separator installed this has been increased to 21 crankshafts per dressing, an increase of 50 pct.

Probably the most interesting example of separator is the successful operation on a Landis IW 5-wheel grinding machine. The operation is to finish grind three main bearings, the flange OD, and the pulley fit diameter on a crankshaft. A 100-gpm Barnesdril magnetic separator is mounted on this machine. The normal coolant openings are plugged, and a sheet metal trough has been inserted to guide coolant and sludge to the separator. Both the coolant sump and the coolant reservoir tank are built under the floor. This is the case in almost all Harvester's separator installations.

Another installation is on a Landis IW 4-

AUTOMATIC LINE for rocker arm shaft grinding uses chip separators on each of its three grinders. Advantages of the automatic operation are preserved by elimination of frequent shutting down to clean out grinding sludge.

"Savings . . . more than offset the original equipment and installation cost."

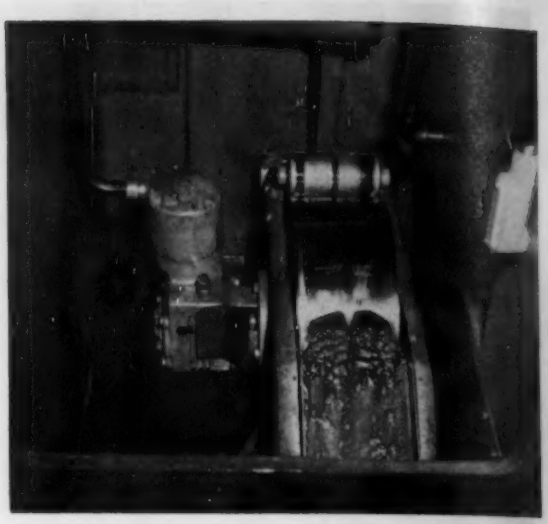
wheel grinding machine. This machine finish grinds the camshaft main bearings to a tolerance of 0.0006 in. A 40-gpm Barnesdril separator is installed, enabling the machine to maintain the required tolerance in addition to the 25 rms finish, also a requisite in this operation.

No machine shutdown

An unusual application to those who think magnetic separators are applicable only to grinders, is a 40-gpm Barnesdril unit on a 2-station FootBurt transfer machine. Two 12-spindle heads on this machine rough and finish ream 12 tappet holes in the Silver Diamond cylinder block. A trough under the heads carries the chips to the separator aided by a stepped-up flow of coolant to provide a flushing action. The separated chips drop into a pit from which they can be easily removed twice a day. It is never necessary to shut down the machine for chip removal.

Three Cincinnati centerless grinders, each served by 20-gpm Barnesdril separators are a part of an automatic rocker shaft line. An automatic cutoff machine cuts the shafts to length from seamless steel tubing. They are then automatically fed through a rough, semi-finish and finish grinding operation. After this, still untouched by the operator, they are automatically stacked in a storage bin.

FOUR-WHEEL GRINDER only needs to be shut down for cleaning twice a month. Similar machine, without separator, is shut down twice a week. Downtime and coolant consumption of machine with separator are thus 1/16 of those on the other grinder. Minor conversion is needed in most cases.



SMALL magnetic chip separator mounted right inside column of gear shaver not only saves downtime for cleaning out of coolant reservoir, but has improved shaving tool life.

The advantages of an automatic setup like this are greatly reduced when there is considerable downtime. Previously it was necessary to shut down this line for an hour twice a week to clean out the sludge from the coolant reservoirs. Now, coolant is added from time to time but it is only necessary to change the coolant in these machines about four times a year.

Trouble had been encountered with the coolant lines, especially those to the diamond dressers. With magnetic separators installed, these coolant lines, as well as the feed and grinding wheel, are kept clean. This results in a better finish on the workpiece.

Another interesting application is a 5-gpm unit mounted inside the column of a Michigan gear shaver. This coolant reservoir previously had to be cleaned out with a complete change of oil every two months. Now it is only required to clean and refill these machines once a year. Cutter life as well as the quality of the gears has been greatly improved.

Time, coolant savings substantial

Less stone loading and better finishes were obtained when a magnetic separator was installed on a Gisholt Superfinish operation. The same is true on honing machines where time and coolant savings are substantial due to reduced need of cleaning out coolant tanks.

A minor amount of conversion is required on most machines. Usually the coolant channels in the bed are sealed and a lead provided to the separator. The coolant reservoir and sump are usually mounted below the floor to conserve floor space. In some cases the separator itself has been mounted partially below floor level.

The savings realized from these installations more than offset the original equipment and installation cost.

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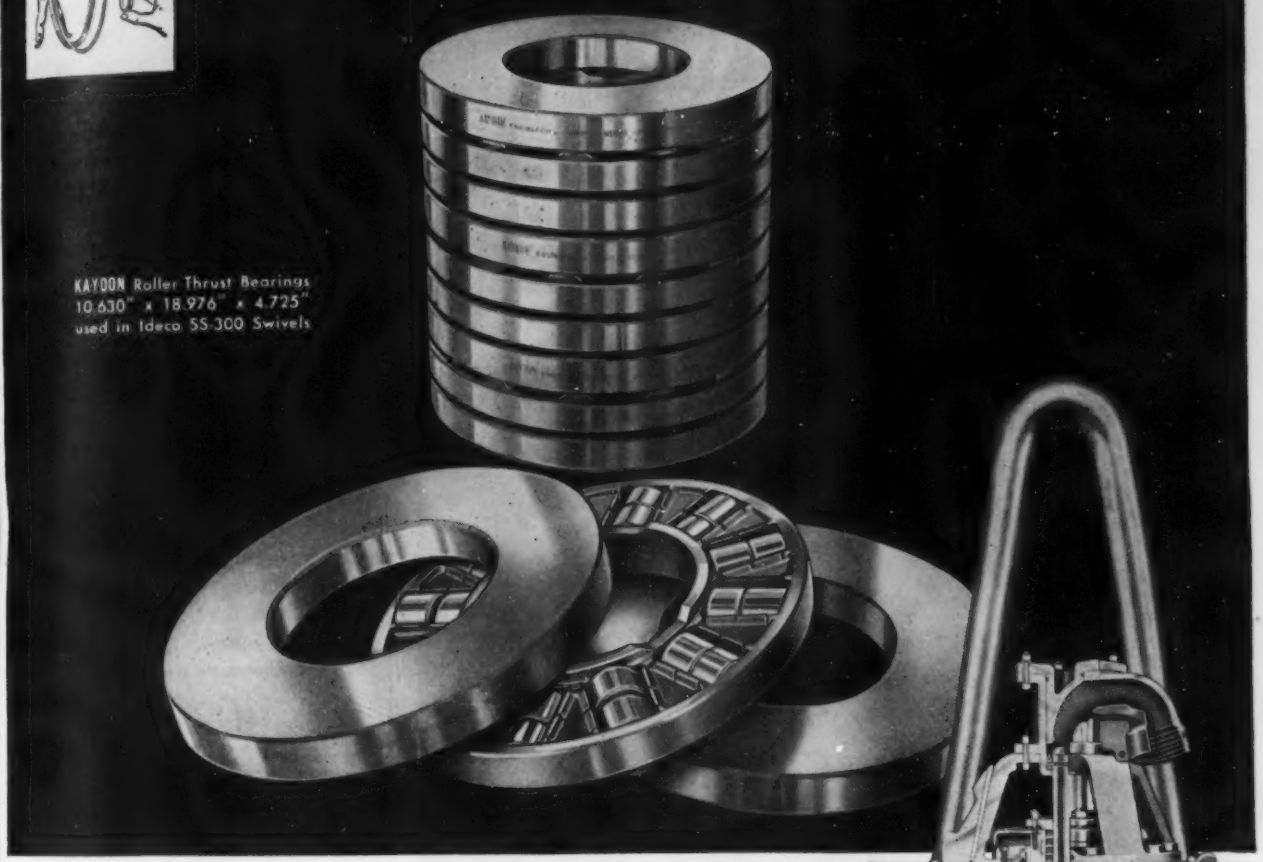

KAYDON Roller Thrust Bearings 10.630" x 18.976" x 4.725" used in Ideco SS-300 Swivels

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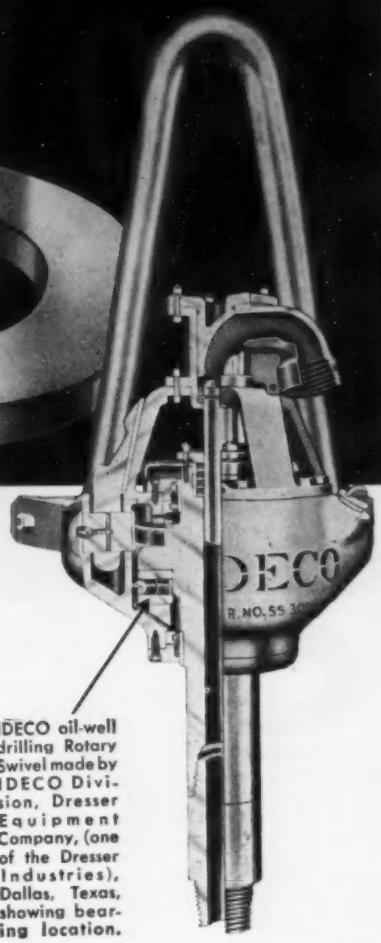
Dead-load capacities to 300 tons have been obtained, without added weight, in IDECO Streamlined Swivels for deep oil-well drilling. The success of these rotary swivels is the result of advanced engineering and years of experience in swivel manufacture. Rugged bearings are vital . . . husky **KAYDON** heavy-duty roller thrust bearings carry the full load.

In many other industries, machine designers find **KAYDON** bearings help make bigger machines possible, without unnecessary bulk and weight. If you have a bearing problem, contact **KAYDON** of Muskegon.



IDECO oil-well drilling Rotary Swivel made by IDECO Division, Dresser Equipment Company, (one of the Dresser Industries), Dallas, Texas, showing bearing location.

KAYDON Types of Standard and Special Bearings:
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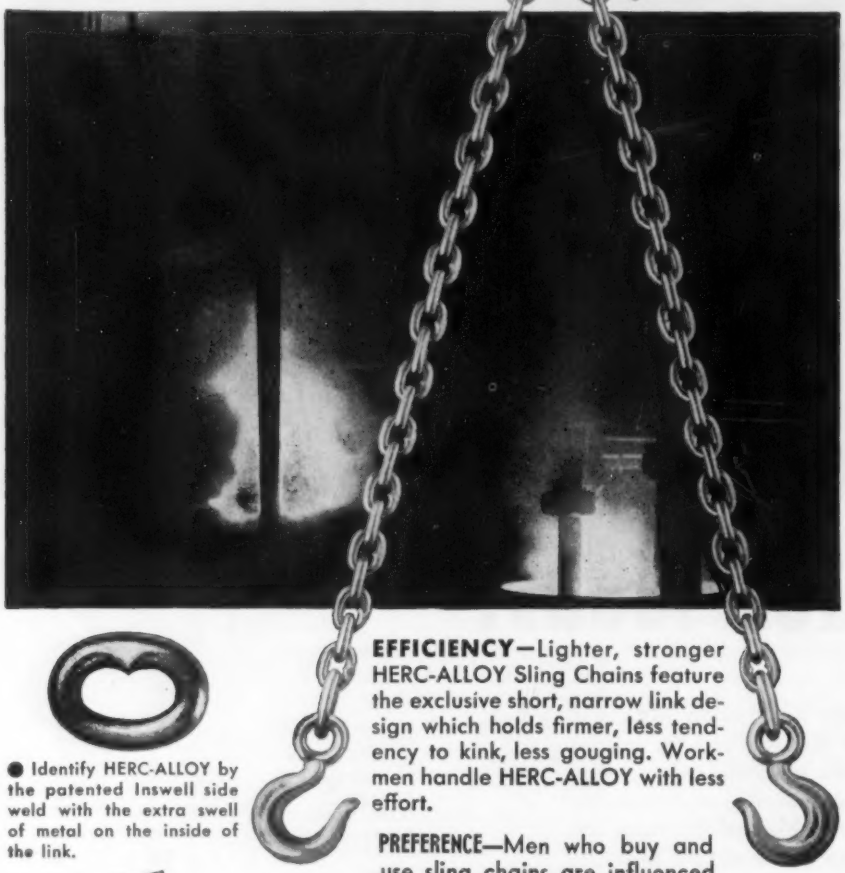

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Continued

Speed reducers

De Laval double-worm and helical-worm gear speed reducers are described in a new 48-p. bulletin. Complete data is given on horsepower, output torque and center distances for reductions up to 6400:1. Information is also available on selection of double reduction gearing, hp ratings and other physical data. *De Laval Steam Turbine Co.*

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Gravity conveyers

Selection of the right size roller gravity conveyer equipment for a specific job is made easier by the information contained in a new catalog. The complete line of Lamson roller gravity conveyer equipment including accessories is described in the publication. In addition, applications of the units are shown. *Lamson Corp.*

For free copy circle No. 14 on postcard p. 147

Tabletting presses

Stokes' complete line of tabletting presses used for several industrial, powder metal, pharmaceutical and plastic preform production operations is outlined in a new catalog. All models of single-punch, rotary, mechanical and hydraulic presses are included. *F. J. Stokes Machine Co.*

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Casters and trucks

The recently revised 36-p. Rapistan Caster and Truck Catalog covers new equipment added to the company's line. Shown for the first time in the catalog are the new 43 Series Caster models designed to combine low cost with durability for medium duty industrial use. Also introduced is the new line of V-Trac casters for use on either inverted angle-steel tracks or on flat floor surfaces. A new Position Swivel Lock available on several caster series to lock swivel units in rigid trailing position is also shown. In addition, information is given on Wheel-Ezy hand and stock trucks used to move bulky loads. *Rapids-Standard Co., Inc.*

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An Invitation

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If, by WELDESIGNING, a properly designated man in your business cannot make savings greater than his salary, The Lincoln Electric Company will make up to you in cash the difference between such savings as are actually effected and the salary of the man designated to do the development work.

The following terms and conditions to govern this offer:

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3. This man so designated will devote his entire time to this development work.
4. You will give authority to the man so designated to proceed with the design, development and manufacture or fabrication by means of arc welding, of products or parts of products manufactured by you.
5. The man so designated and his work are to be accessible at all times to Lincoln development engineers for consultation and suggestions.
6. Your regular cost accounting system, or variation thereof as agreed upon between us, is to be applied to his work over a period of two years. If at the end of such period your records do not show savings over former methods, greater than the salary of the man so designated above, The Lincoln Electric Company will pay you in cash the difference between such savings as are actually effected, and the salary of the man, this amount under any conditions not to exceed the salary of the man.

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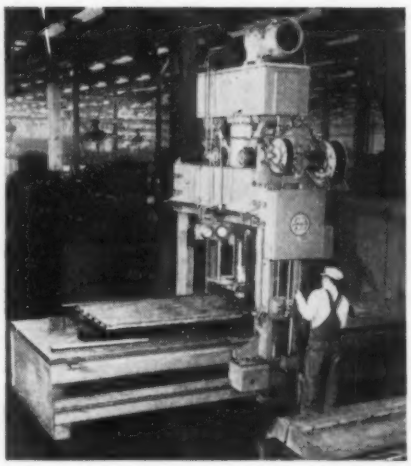
NEW equipment

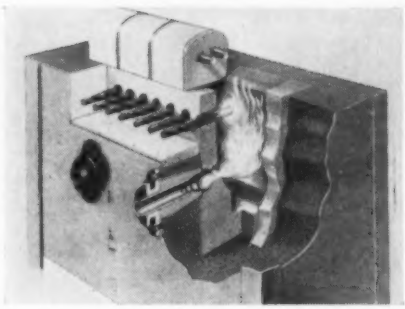
New and improved production ideas, equipment, services and methods described here offer production economies . . . fill in and mail postcard on page 147 or 148.



Travelling-head presses have strength, versatility

The travelling-head straightening press illustrated represents the smallest of a complete line of these versatile machines. Presses, ranging in capacity from 200 to 2000 tons, feature optional two-speed ram travel in both longitudinal and transverse directions over the entire bed area, reducing setup and operating time required for straightening work. Presses are available with one or two travelling heads on the same bed frame. Unusual strength is provided by dovetailed keys on the side frames that grip the bed in a pincer-like action during pressing operations. Additional rigidity is provided by large horizontal keys that secure the side frames to the cross-head above the bed and to the cross-tie below the bed. Other features include use of wheels for smoother traversing action, totally enclosed gearing, adjustable pressure and stroke controls, pushbutton-hand lever controls. *Lake Erie Engineering Corp.*

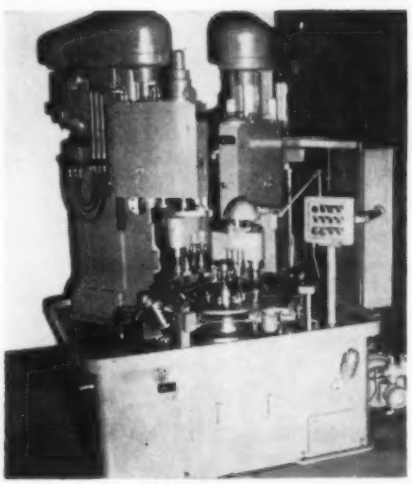
For more data circle No. 17 on postcard, p. 147.



Forging furnace lengthens tool life

Accurate heating provided by a new forging furnace means longer tool life and makes economies of high speed chisels practical for any plant. Forgeatrol furnaces heat high speed and alloy chisels for both forging and hardening, provide true cold shank heating. Heat is confined to the chisel point, preventing loss of temper in the shank during tool redressing. Shank breakage is virtually eliminated in tool use. In most cases, the shanks remain cool enough to forge without tongs. Fast, uniform heating is controllable between 1200°-2800°F. *Delaware Tool Steel Corp.*

For more data circle No. 18 on postcard, p. 147.



Drilling, tapping machine features fast indexing

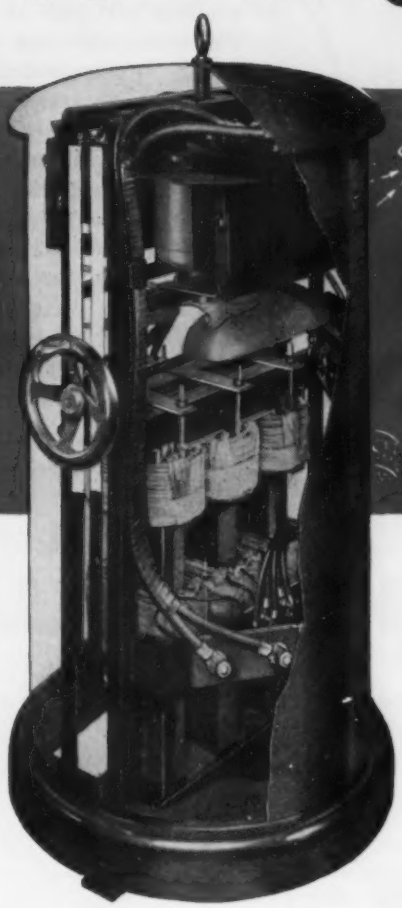
New No. 75 drilling, reaming, tapping, and threading machine is hydraulically operated and electrically controlled. It has a very fast index which can be furnished with any number of divisions. Table has built-in self-centering 3-jaw or 2-jaw chucks hydraulically operated so that they will automatically close before going through the first operation, and hold through both operations, then automatically open. Drilling side is driven by 5 hp motor and tapping side by 3 hp motor through a 3-step V-belt cone pulley arrangement and pickoff gears to provide speeds in 12 steps from 240 to 1328 rpm. The whole machine is built ruggedly to take continued production. The machine illustrated was tooled to ream and tap 2700 pieces of malleable iron nuts per hr gross with 2⅞ in. tap diam. This particular machine was also furnished with automatic unloader. *Kaufman Mfg. Co.*

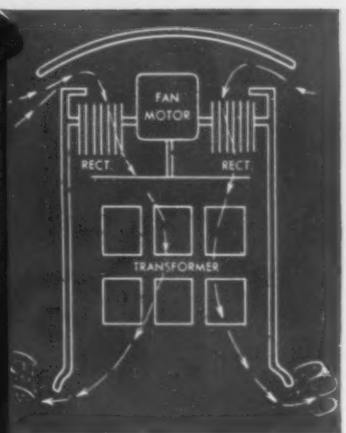
For more data circle No. 19 on postcard, p. 147.

Turn Page

The only rectifier welder designed to eliminate stack failure!

High-velocity, DOWNDRAFT VENTILATION keeps rectifier stacks cool in the A.O.SMITH D.C. WELDER





Sectional view of the new A. O. Smith Rectifier-type D.C. Welder and diagramatic drawing show ideal location of stacks and circulation of high-velocity air through the welder.

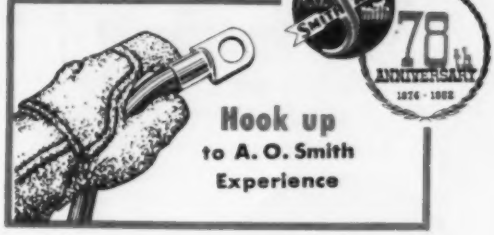
Available in 200-, 300-, and 400-amp. models.

Location of rectifier stacks in the flow of cool, clean air entering the top of the A. O. Smith D.C. Welder assures positive cooling of these most critical parts.

Wind tunnel design, proved for more than a decade in A. O. Smith Heavy Duty Welders, blasts cool air down and over rectifier stacks. This prevents stack failure. In addition, clean rectifier stacks and clean glass-insulated heavy copper transformer coils are assured. Maintenance down-time is thus avoided.

This marked advance over conventional rectifier-type welders solves overheating problems, ends limitations on duty, avoids introduction of floor dirt and eliminates rectifier stack failure.

Other refinements provide effortless amperage control, universal application and economical operation. They, too, are exclusive in this advanced design, rectifier-type, D.C. Welder.



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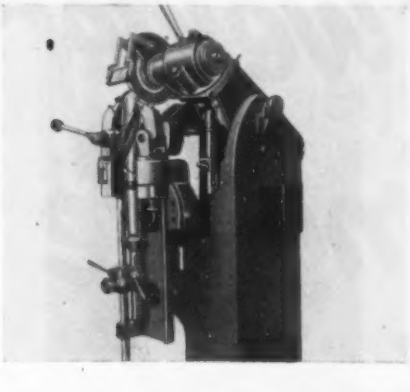
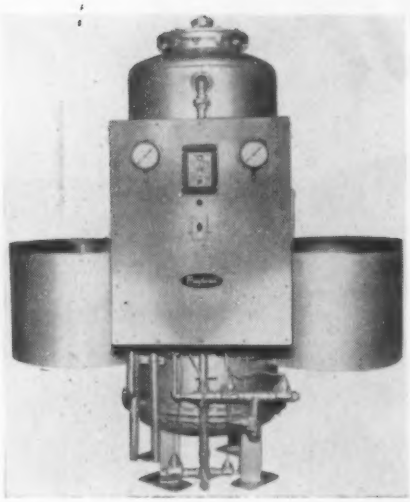


Twist drill pointing, web thinning with one machine

The two front angles of a twist drill point are ground symmetrically and the thickness of the flutes reduced at the same time by the oscillating grinding wheel used in the German made machine, the May Model A4. Drills from 0.393 to 2.95 in. diam can be clamped between the spring-loaded jaws, and the grinding wheel is moved manually to the point of the drill. Clamping and all sharpening motions are mechanically locked, so that accuracy is independent of the skill of the operator. An indicator allows selection of three types of grinding. Machine requires 40 x 2[illegible] in. floor area. Height is 56 in. Grinding spindle is driven by ¼ hp motor, by a belt running over tension rollers. *Kurt Orban Co., Inc.*

For more data circle No. 20 on postcard, p. 147



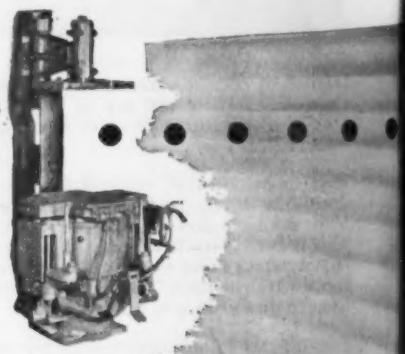
Demineralizer features automatic advantages

A fully automatic Mono-Bed demineralizer performs all its operating functions, including the regeneration cycle, completely automatically. There are no valves to operate and no supervision is required. Whenever the effluent's conductivity falls below standard, the treated water is automatically discharged and lights or other warning system signal the need for activation of a regeneration cycle. Turning of a single switch then puts the unit through its regeneration cycle automatically, including rinsing and recutting in the effluent when desired resistivity (purity) is reached. During this automatic regeneration cycle, the regenerative tanks are automatically refilled with water so that fresh acid and caustics may be added in preparation for the next regeneration cycle. The demineralizer is available in flow rates from a few gallons per hour to 5000 gph; operates for a chemical cost of only pennies per 1000 gal of treated water, provides effluent with zero mineral content. *Penfield Mfg. Co., Inc.*

For more data circle No. 21 on postcard, p. 147

FROM THE SMALLEST

There's a SPO for every job!



From the smallest to the world's largest jolt-squeeze-stripper, **SPO** has a model to meet every foundry production need. **SPO** molding machines range from small, portable, manually operated units to fully automatic, push-button giants.

Regardless of its size, each **SPO** molding machine is built for safe, dependable operation and maximum accuracy. Many feature the patented "inverted jolt" mechanism which assures extremely long service life with minimum maintenance. All incorporate **SPO** air vibrators which are known for their sturdy construction and operating efficiency.

Whatever your production schedule, **SPO** builds a molding machine to meet your requirements. To obtain the finest foundry equipment available today, **SPECIFY SPO . . .** ***the world's largest supplier of molding machines.***

Write today for Bulletin No. 2000 for complete data.

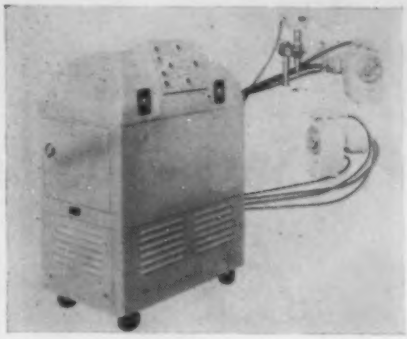
SPO INCORPORATED

512-SI

Automatic duplication on a production basis

A new device for use with mill or lathe makes possible automatic duplication of machined internal and external profiles and contours on a production basis. Known as the Lodge & Shipley duplicator, the unit accurately controls two feeds of the machine for reproducing from a template or original model or workpiece difficult compound curves and 90° shoulders. It acts as an attachment and does not have to be removed for use of the machine on other work without interference. Duplicator can be moved from machine to machine as the need arises. Any machine with which it is used operates at normal feeds and speeds. *Tracer Control Co.*

For more data circle No. 22 on postcard, p. 147.



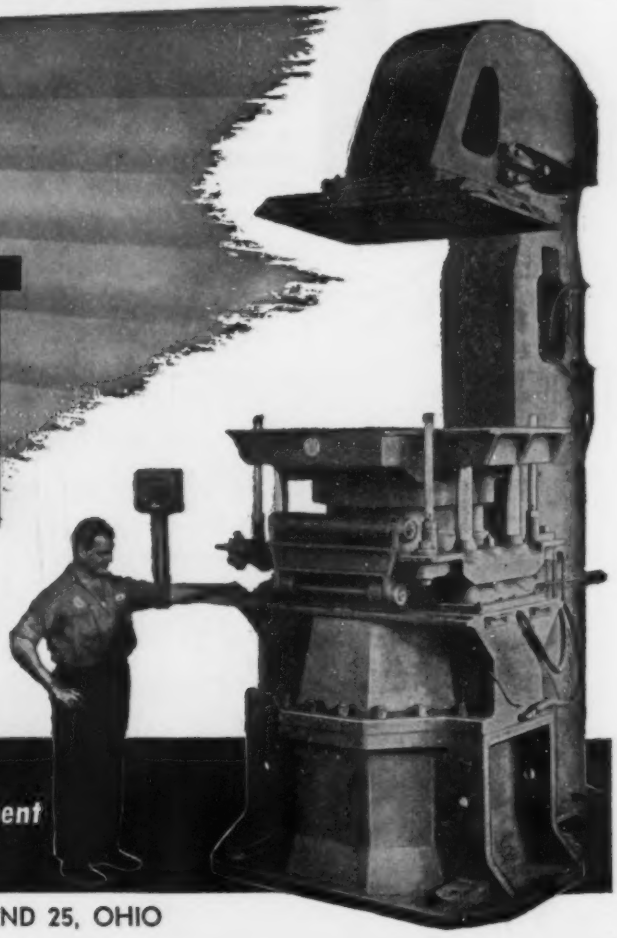
Turret drilling machine has 4 or 6 spindles

Driven by one motor, spindles of the Bekoma turret drilling machine are mounted radially on a circular carrier, which revolves around the center column. Each spindle has a hand feed, adjustable depth stop and spindle return spring with variable tension. A central V-groove pulley drives each spindle independently. Torque to spindles is transmitted through hardened spline shafts. By using adjacent spindles as intermediate countershafts, 24 spindle speeds, ranging from 28 to 1500 or 56 to 3000 rpm, can be obtained. Spindles have No. 2 Morse taper and accept drills up to 23/32 in. diam; maximum travel, 5 in.; vertical adjustment, 6 in.; 16-in. distance between spindles and table; between spindles and column, 6¾ in. One to four operators can work at the same time. Workpieces can be indexed and brought, in turn, into the exact working position. *Cosa Corp.*

For more data circle No. 23 on postcard, p. 147.

Turn Page

TO THE
BIGGEST
Molding Machine



Manufacturers of MILWAUKEE type foundry equipment

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ROUND WOODHOUSE CHAIN & MFG. CO.— established in 1884 — joined the nationwide Round organization in 1936. Under the management of Willis J. Keenan, who has been a Round Chain man for 15 years, Woodhouse now offers *a complete line* of welded and weldless chain, slings, chain hoists, electric hoists and trolleys to the important Middle Atlantic market. *Sold exclusively through distributors and wholesalers.*

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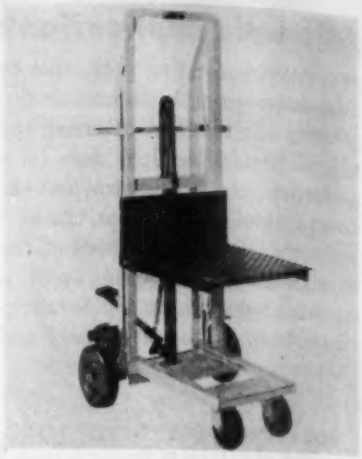
SLING CHAINS • LOG CHAINS • HOIST CHAINS

HOISTS • HOOKS • FITTINGS AND ATTACHMENTS

Round CHAIN COMPANIES

THE OLDEST NAME IN CHAIN — ROUND



Platform lift

With a new Big Joe hydraulic lift, loads up to 750 lb are raised or lowered by easy step-on-it pedal pressure. To make horizontal movement of the loaded lift similarly easy, the Model 14S is equipped with heavy duty, dual ball bearing 6-in. diam swivel casters that take humps, holes or depressions in stride. Solid rubber rear wheels 10-in. diam, and positive locking safety brakes are other features. *Big Joe Mfg. Co.*

For more data circle No. 24 on postcard, p. 147.

Carbide ring gages

A line of carbide thread ring gages designed for volume gaging of identically sized threads are claimed to deliver 30 to 50 times more inspected parts than regular steel thread rings. The gages can be reserviced for wear and may be used as master or reference rings. *Hanson-Whitney Co.*

For more data circle No. 25 on postcard, p. 147.

Sealed rectifiers

Sealed rectifiers that solve the corrosion and dirt problem for the plating industry use water coolers as the cooling agent and completely seal the cooler in the interior. A fan circulates the sealed-in air over copper tube aluminum-finned water circulating coils. Trapped air does not exceed 95°F at any time. Water is obtained from normal sources and the discharged water can be used for rinse purposes. *Bart-Messing Corp.*

For more data circle No. 26 on postcard, p. 147.

Spring coiler

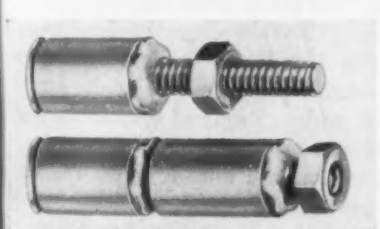
Hand-operated spring coiling machine for making compression, extension and torsion springs has been redesigned to include a structural steel baseplate and improved method for cam adjustment. Compression springs are coiled with both ends squared automatically. Extension and torsion springs can be wound left or right hand with long extended arms on both ends. Setup time is usually less than 5 min, and about 300 springs can be wound per hr. Capacity: Wire diameters from 0.004 to 0.063 in. with OD to 1 in. and spring lengths to 4 in. *Carlson Co.*

For more data circle No. 27 on postcard, p. 147.

Brazing material

New material for high temperature brazing of molybdenum and tungsten electronic components is a powder known as Mo-braze. It melts at a 3450°F temperature and forms a continuous and very strong braze upon solidifying. The brazed joint is formed rapidly, usually without any oxidation of the parts. *American Electro Metal Corp.*

For more data circle No. 28 on postcard, p. 147.



Anchor bolts

New single and double anchor bolt assemblies are guaranteed to give 50 pct greater anchorage; can be used wherever anchor bolts or expansion bolts are used. Installation of the assemblies is easy. After insertion of the anchor bolt, lead sleeve and cup shaped steel anchor, a tamping tool mushrooms the lead first. Repeated blows flatten out the steel anchor driving its ribbed steel edges into the walls of the hole. Steel reinforces lead and provides a permanent, solid anchorage that prevents bolts from loosening. *Super-Grip Anchor Bolt Co.*

For more data circle No. 29 on postcard, p. 147.

Turn Page

Steel strapping service like this prevents shipping damage

HERE Cliff Onthank, Brainard salesman in Grand Rapids, shows a customer's shipping man how to apply the Brainard Strapping System to make a "floating load" shipment in a boxcar. By strapping all the cartons in a shipment together, the entire load can shift as a unit during impact, and thus avoid damage.

The proper application of steel strapping is just as important as the strapping itself . . . that's why *demonstration* is a key part of Cliff Onthank's job. Like his fellow Brainard salesmen, he has the experience and know-how to give you all-round good service.

To improve your shipping and materials-handling operations, give your problems to your Brainard salesman . . . offices located throughout the U. S. In Canada, P. J. McArthur Company, Toronto.

COMPLETE STEEL STRAPPING SERVICE, LIGHT AND HEAVY DUTY STRAPPING, TOOLS AND ACCESSORIES

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dependable
eye protection

keeps you on the safe side

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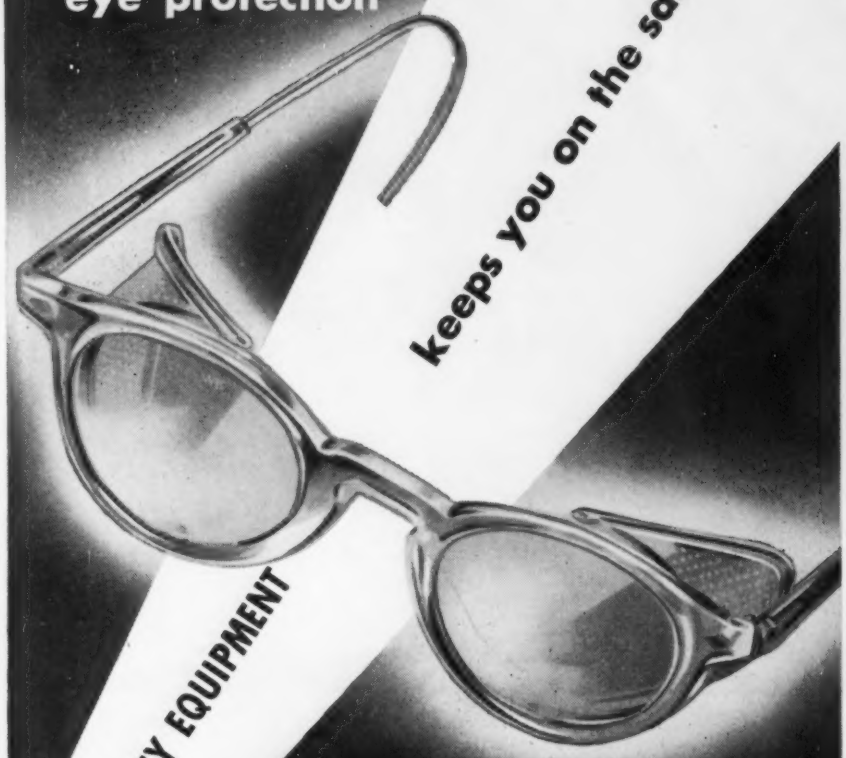

Combined protection, comfort and appearance make Willson safety spectacles outstanding in value. Choose from a full range of metal and plastic frames—fitted with Super-Tough* heat-treated glass lenses, or Plas-Tough* plastic lenses—every one tested for impact resistance and optical quality. Send for catalog describing our complete line of safety equipment.

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METAL FRAME Latest style spectacle with single bridge. Have Hi-Line temples with a "dressy" look. Also available with side shields. (Non-flammable plastic frame Style WKS shown at top.)

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Three popular types of lenses are available for all Willson Spectacles. Clear glass Super-Tough*, Willsonite® Green Super-Tough* and the new Plas-Tough* lenses that combine the impact resistance of heat-treated glass with the comfort of lightweight plastic.

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Diesel pyrometer

Portable diesel engine pyrometer is designed for test purposes and for installations where no permanently mounted pyrometer is available. Thermocouples can be installed in each cylinder and in the main exhaust line. Temperatures are checked by inserting pyrometer prongs into terminal head of thermocouple. *Bristol Co.*

For more data circle No. 30 on postcard, p. 147.

Metal cleaner

Kemisol A is claimed to remove all traces of oil and grease from metal parts. When mixed in a solution from ½ of 1 pct to 1 pct with water at approximately 180°F, it offers a thin, inexpensive solution which can be used in almost all methods utilized for cleaning metal parts. It is neutral, odorless, non-toxic, non-inflammable, harmless to skin. *Wayne Chemical Products Co.*

For more data circle No. 31 on postcard, p. 147.

Four-drum capacity

Drum-carrying lift truck features a Tray-Hart drum carrier mounted on a 3000-lb capacity Jeep truck. The four-drum carrier attachment weighs 750 lb, is 54 in. long x 51 in. wide. Front of the carrier may be used to push drums into pick-up position. A misalignment compensator automatically shifts carrier 4 in. when truck is not in line with load and special angles place drums into gripping position as carrier frame is lowered over the load. Gripping shoes have non-slip lining. Their wedge action insures positive grip. *Mercury Mfg. Co.*

For more data circle No. 32 on postcard, p. 147.

Turn Page

THE STEEL YOU BUY DEMANDS *Complete Integration* TOO!

For only *complete integration* of every process can assure you quality-as-specified. Here is the big reason for Alan Wood Steel Company's *single control* of each production step—from ore mine to finished product.

Alan Wood steel making takes nothing for granted—involves no outside factors. We mine our own ore, test it in our own laboratories, smelt it in our own furnaces, roll it in our own rolling mills. And rigid Alan Wood quality control checks on every process—every step of the way.

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STAINLESS CLAD STEEL
PERMACLAD Stainless Clad Steel combines the surface characteristics of solid stainless with the easy forming qualities of mild carbon steel—provides corrosion resistance at lower cost.

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A.W. ALGRIP Abrasive Rolled Steel Floor Plate is made by rolling tough abrasive grain as an integral part of the upper portion of steel plate. Result: Positive protection against slipping, even on steep inclines.

ROLLED STEEL FLOOR PLATE
A.W. SUPER-DIAMOND
Rolled Steel Floor Plate, made with an allover, engineered pattern of raised, skid-resistant diamonds, is easy to clean, easy to match, and grips without a slip.

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Special qualities in carbon, copper, or alloy analyses
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Standard and special qualities available in desired finishes

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Iron Ore Concentrates, Sintered Concentrates, Crushed Stone, Grit, Sand and Engine Sand

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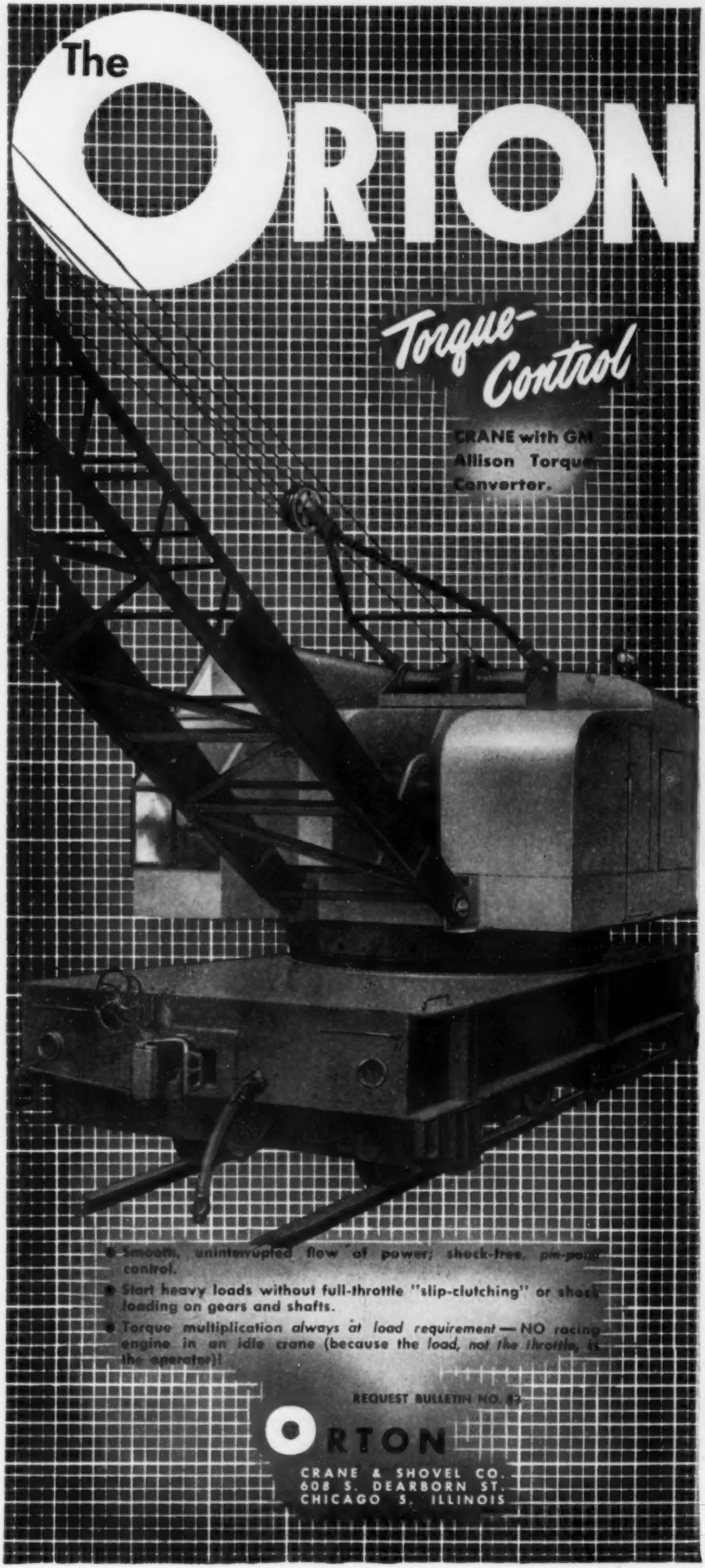
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CRANE with GM Allison Torque Converter.
• Smooth, uninterrupted flow of power; shock-free, pin-point control.
• Start heavy loads without full-throttle "slip-clutching" or shock loading on gears and shafts.
• Torque multiplication always at load requirement — NO racing engine in an idle crane (because the load, not the throttle, is the operator)!
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—New Equipment—

Continued

Cold galvanizing

New cold galvanizing process for surface protection of steel and iron utilizes Galvanite cold galvanizing compound. The new coating is not a paint. Iron and steel surfaces coated with Galvanite create an electro-chemical union, uniting the zinc with the base metal's surface. Applied onto adhering rust, it induces the rusted area to create its own non-flaking coating, stopping further rust and preventing rust creep. *Galvanite Corp.*

For more data circle No. 33 on postcard, p. 147.

Magnetic brake

New magnetic brake design eliminates all levers and linkage found in conventional units. The brake contains only six major operating parts and features a direct, automatic set and release action between the solenoid and armature. A one-piece doughnut design solenoid permits the motor's output shaft to extend completely through the brake, permitting both ends of the motor shaft to be used for powering two pieces of equipment when desired. *Reuland Electric Co.*

For more data circle No. 34 on postcard, p. 147.

Power bit

New design of a Russell Jennings power bit, the 100ED, with the 50-50 brad screw point, provides fully controlled power drilling in any three-jawed chuck. It is designed to drill smoother, cleaner-cut holes, faster, easier, in soft or hardwood giving the operator full control at all times. Bits are high carbon steel, tempered for lasting edges, with hand-filed extension lips and spurs for keen cutting. *Stanley Tools.*

For more data circle No. 35 on postcard, p. 147.

Turn Page

L. H. BUTCHER COMPANY

THE
Udylite
CORPORATION
DETROIT 11, MICHIGAN

PIONEER OF A BETTER WAY IN PLATING

Specialists in Industrial Cleaning Products

W. H. Pape, of the V-M Corporation, says:

"Wyandotte specialized cleaners and on-the-job service invaluable to us"

"WE PRIDE ourselves on our complete facilities for production of automatic record changers and allied electro-mechanical devices," states Mr. W. H. Pape, of the V-M Corporation, Benton Harbor, Michigan, a leader in its field.

"Our organization has grown from 15 people in 1944 to more than 750 today. It was built on our ability to produce high quality at attractive prices. This necessitates rapid design changes, quick production change-overs, and proper metal-cleaning practice for all metal parts.

"Since our beginning, we have depended on Wyandotte specialized products for most of our metal-cleaning needs. By working closely with a Wyandotte Service Supervisor, we get top results and eliminate costly shut-downs.

"Currently, we are using Wyandotte W.L.G.* and B.D. in our various operations because they meet our rigid quality-control requirements."

How about your metal-cleaning operations? This same Wyandotte service is available to you without charge or obligation. And Wyandotte offers you the finest line of specialized cleaning compounds in the world. *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 54, Calif.* *REG. U.S. PAT. OFF.

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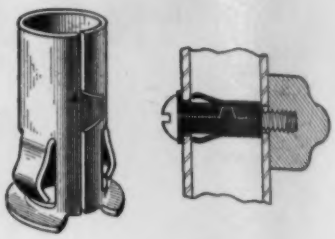
Helpful service representatives in 88 cities in the U.S. and Canada

New Equipment

Continued



Spacer clip

Spacing of parallel metal panels without buckling is achieved with a new tubular type Speed Clip. Used more specifically for spacing panels of drawers in cabinets, etc., the clip is inserted through a hole in a drawer liner, and is held in a self-retaining position. A machine screw is then inserted into the clip and through the outer panel where the screw engages the threads in the drawer handle. *Tinnerman Products, Inc.*

For more data circle No. 36 on postcard, p. 147.

Mortising attachment

Mortising attachment consists of a fence assembly which bolts to drill press work table, a mortising chisel holder which clamps to drill press quill and three sizes of mortising chisels and bits; ¼, ⅜ and ½ in. For making square end mortises quickly and accurately, the attachment is a worksaver. *South Bend Lathe Works.*

For more data circle No. 37 on postcard, p. 147.

Thickness testing aid

Economy, speed and convenience of non-destructive thickness measurement by the ultrasonic Audigage thickness tester can be materially increased under awkward conditions by the use of a new magnetic fixture to hold the searching unit against the plate being tested. This accessory assures good contact and prevents accidental shifting of the searching unit during tests. It permits one man to operate the instrument alone in different locations. It is valuable when working on ladders or staging, and when test points are beyond easy reach, such as tank bottoms and sides. *Branson Instruments, Inc.*

For more data circle No. 38 on postcard, p. 147.

Internal pipe wrenches

A basic manufacturing improvement increases strength and shock resistance of Roddick internal pipe wrenches. Center eccentric is formed into place permitting a different heat-treatment of the high strength alloy steel, resulting in a tougher structure. Wrenches grip instantly in either direction without damage to threads or pipe walls. Standard sizes range from ⅛ to 4 in. *Roddick Tool Co.*

For more data circle No. 39 on postcard, p. 147.

Metal hardness tester

With a pocket size metal hardness tester that weighs only 7 oz, hardness is checked by rebound. The surface is not marred as greatly as in the case when penetration is used. The portable instrument allows work (including round parts

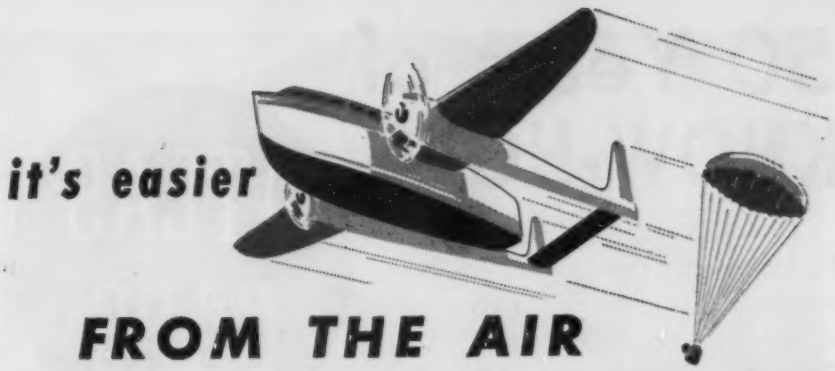
in lathes) to be tested without removing it from the metal working machine. Direct readings are obtained on any of three different Rockwell and Brinell scales without the use of conversion charts. Any machinist can get accurate readings after simple instructions. *Peabody Industries, Inc.*

For more data circle No. 40 on postcard, p. 147.

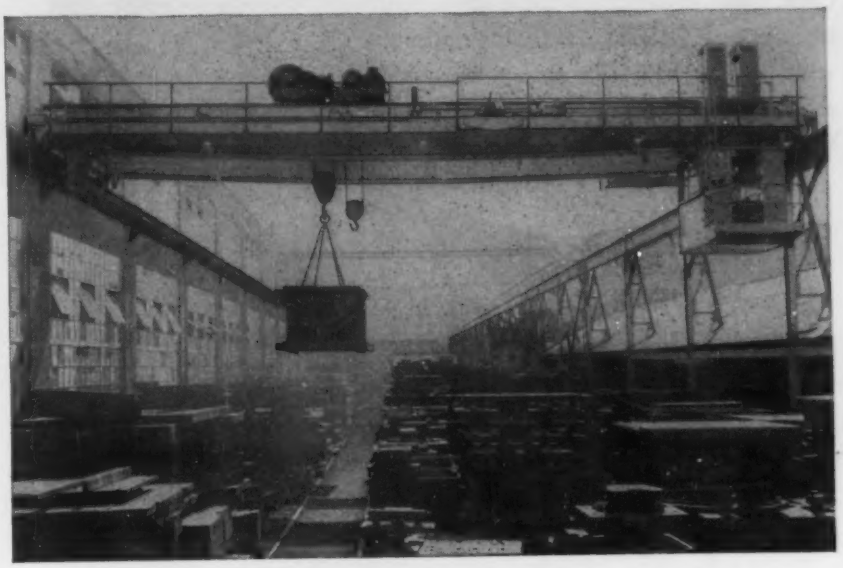
Two conveyer pulleys

Griplex R Spiralagging conveyer pulleys are welded-steel belt conveyer pulleys. Lagging is made from extra-strong duck, with extra-thick rubber facing and is applied in one continuous piece under tension. New heavy-duty conveyer pulleys with Wedg-Tite tapered hubs are for large conveyer installations where horsepower and tonnages run high. Hubs are split-tapered construction for speed of installation and removal. They are totally enclosed, dirt and splash-proof, in sizes 6 in. diam x 63 in. face, for shafts up to 10 in. *American Pulley Co.*

For more data circle No. 41 on postcard, p. 147.



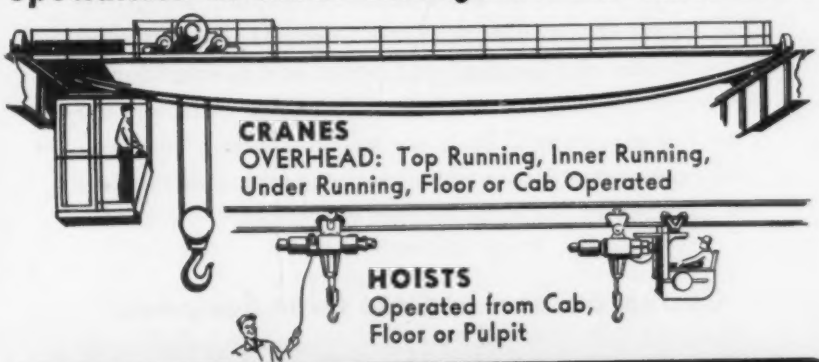
it's easier FROM THE AIR



● Want to spot loads more accurately — stack them higher? Then put this Shepard Niles Crane to work! From his vantage point, the operator can see where loads should go, then deliver them there directly.

● Little wonder so many plants use through-the-air handling — it's so fast, so easy, so economical. But which crane is best for your plant? The Shepard Niles representative is qualified to answer this question because he specializes in through-the-air handling. He knows the importance of installing the right equipment from the start. Write for Bulletin 180 today — and ask to have a representative stop by your office.

Specialists in loads through-the-air since 1903



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OVERHEAD: Top Running, Inner Running, Under Running, Floor or Cab Operated

HOISTS
Operated from Cab, Floor or Pulpit

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CRANE AND HOIST CORPORATION

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For more than 50 years Atlas has been designing coke oven machinery of acknowledged excellence. Coal Charging Cars, Coke Quenching Cars, Door Extractors and Coke Guides *must* be built with "know-how" to produce best operating results and lowest maintenance. Let Atlas quote on your needs.

COKE QUENCHING CAR

The latest Atlas Quenching Cars have longer life with lower maintenance than previous types. Their cost also is lower. This is due to the welded "corrosion-resisting" frame of heavier material with fewer joints and all joints weld-sealed together with the use of abrasion resisting floor plates, which outwear cast plates and cost much less to replace. There is no welding on Atlas abrasion resisting floor plates The improved door operating mechanism is sealed against the entrance of coke dust and water and is simplified to eliminate the troublesome line shafts. Coke deflectors are provided at each end. Air hoses are armorclad. Gates generally are of steel bars arranged for easy replacement. Cars are supplied with or without upper coke racks.

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—Technical Briefs—

Electron Microscope:

Chrysler researchers study blood, rubber, brake linings.

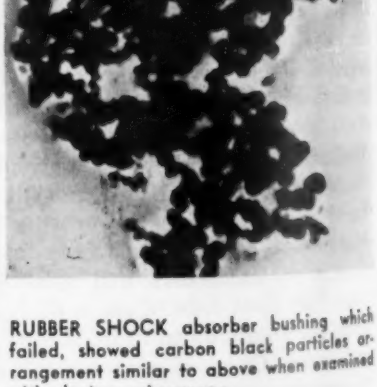
Use of the electron microscope is enabling Chrysler researchers to make discoveries in such widely differing fields as tissue and cell structure, metal microstructures, brake lining and rubber compounds.

Results of the submicroscopic research were recently disclosed by Dr. Sumner B. Twiss, head of the physical-chemical research laboratories in Chrysler's Engineering Div.

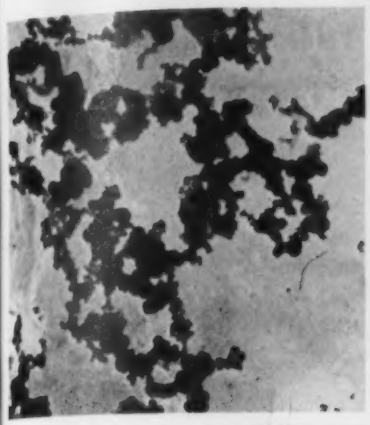
Can See Viruses—The electron microscope with its magnification of more than 50 times a light-using, optical microscope, makes it possible to see and photograph viruses. Until development of the electron microscope, these were considered invisible agents. Metal microstructures are also studied.

One of the most important developments came in a study by Dr. Maxwell Teague of hardening of the arteries. These studies supported the theory that a high molecular weight cholesterol-protein complex is present in blood of persons whose arteries undergo changes thought to precede coronary disease.

Rubber Bushings—Researchers say that results in solving industrial problems have been equally dramatic. Tests of rubber shock



RUBBER SHOCK absorber bushing which failed, showed carbon black particles arrangement similar to above when examined with electron microscope.



CARBON BLACK particles in rubber bushing which passed tests had not only large particles, but additioanl network of very small carbon black particles.

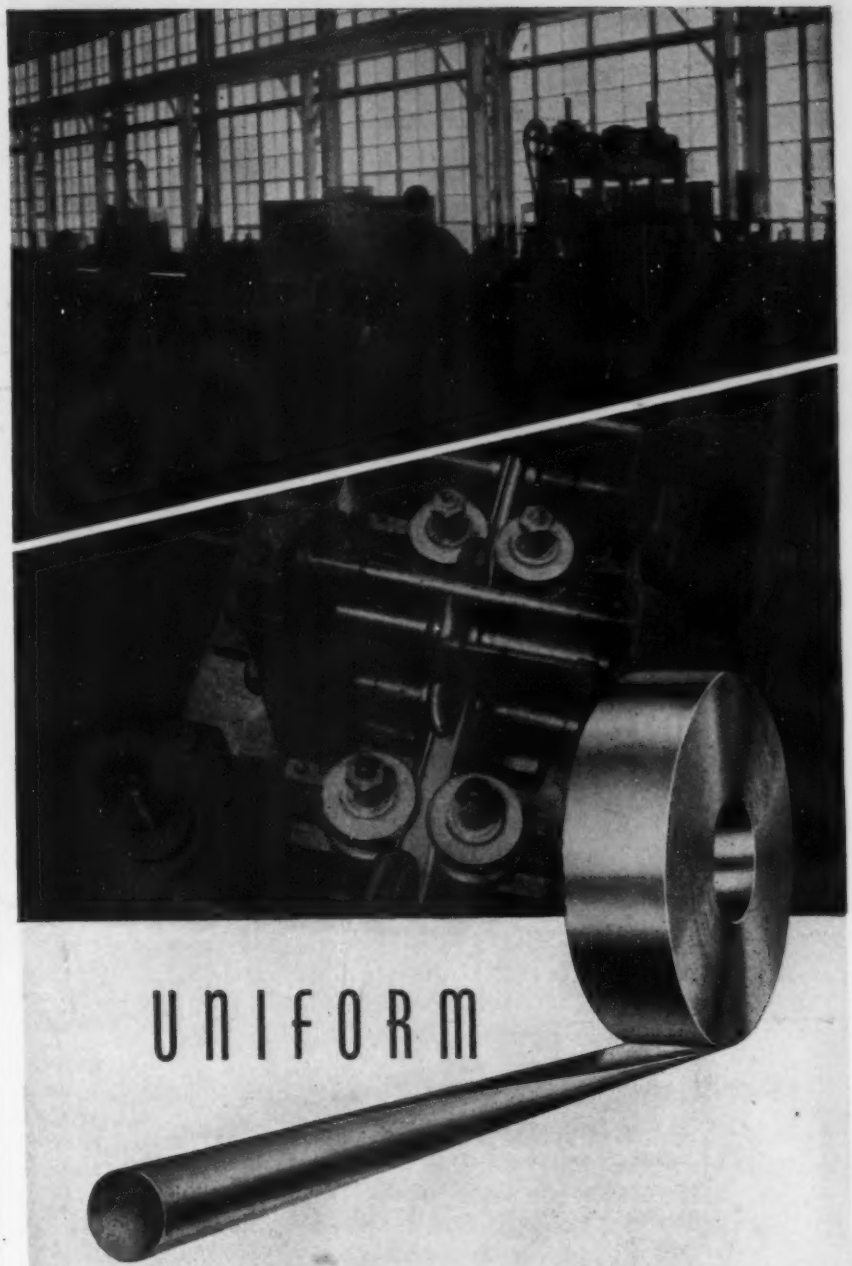
absorber bushings revealed failures for which there was no apparent reason.

Yet the electron microscope revealed that while the carbon black in all compounds of the rubber tested had large particles arranged in a network structure, the best compounds contained also another type of carbon black consisting of very small particles. Poorer grades contained only the large size particles.

Effects of Braking—The electron microscope has helped researchers study brakelinings to see how asbestos fibers reinforce the lining material and to visualize the mechanics of the braking operation. New studies show the changes in structure before and after braking, thus showing the effect of heat developed in the braking action.

The microscope uses a beam of electrons generated by 50,000 volts. It passes through a vacuum and is controlled and focused by circular electro-magnetic lenses. The wave length of light limits the ordinary light microscope to a magnification of about 2000. The new electron magnification has a power of over 100,000 diam.

Electrons are invisible so the final magnified picture appears on a fluorescent screen, very similar to a television screen. Photographs are made by inserting a photographic plate beneath the viewing screen. The plate responds to the electron beam as it would to light.



UNIFORM

Newly built and newly equipped, Wallingford's tubing mill is as modern as today. This equipment, operated by men of experience, using Wallingford strip steel of consistently high quality, produces tubing that in analysis, tolerance and finish can be counted on to be uniform at all times. This complete dependability provides savings in fabrication. Less down time, fewer rejects, and a finished product of constant quality is assured with Wallingford uniform tubing.

THE WALLINGFORD STEEL CO.

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WALLINGFORD, CONNECTICUT, U.S.A.
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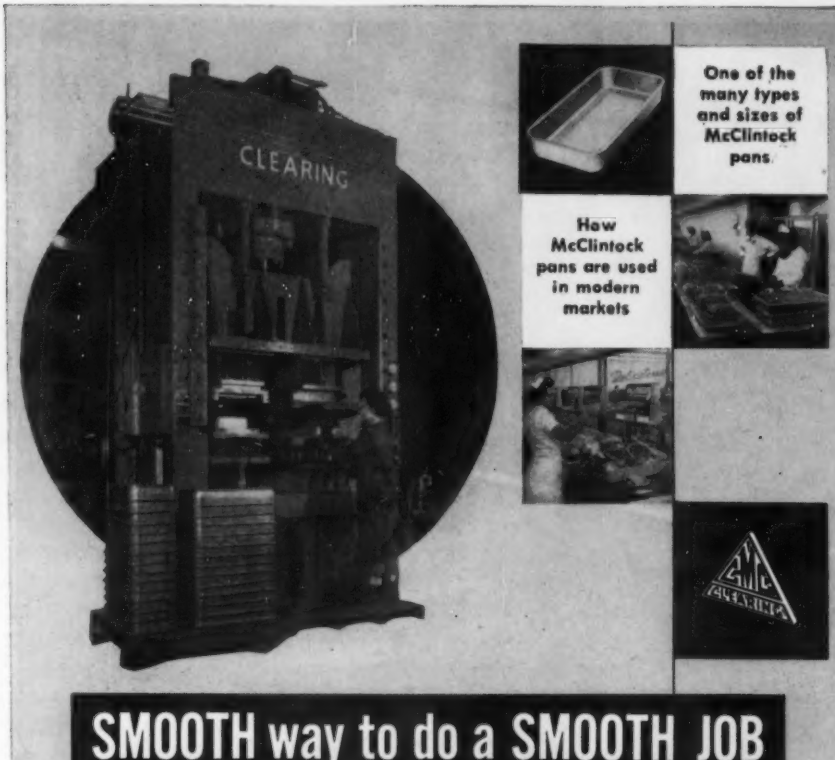


SMOOTH way to do a SMOOTH JOB

McClintock Manufacturing Co. of Los Angeles manufactures an extensive line of metal platters and pans used by up-to-date markets for the display of meat. For space in the cabinets, the pans must be rectangular; for sanitary reasons they must be one-piece and perfectly smooth. And they can't cost too much, either.

In the picture you see how McClintock uses a Clearing hydraulic press in drawing these pans. Automatic sequence control simplifies operation and delivers maximum production. Cushion pressure is accurately regulated, and the result is a smooth piece smoothly produced every time.

Whether your metal forming problem is like this one, or entirely different, Clearing engineers can help you. Clearing makes both mechanical and hydraulic presses to fit virtually any production requirement.

CLEARING MACHINE CORPORATION
6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS
HAMILTON DIVISION, HAMILTON, OHIO

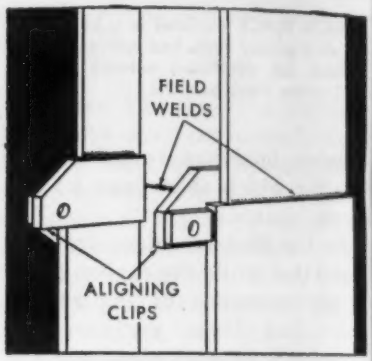
CLEARING PRESSES
THE WAY TO EFFICIENT MASS PRODUCTION

Welded Structures:

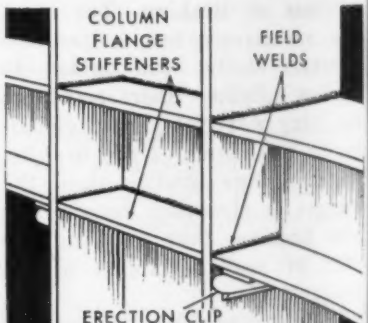
Savings in tonnage, labor possible where welding is used.

Savings in steel tonnage and reduction in man-hours required for fabrication are reported as major benefits in use of arcwelding for erection of welded structures.

Reports from builders and construction companies across the country place emphasis on the marked savings possible. Typical of reports is that by J. R. Braun, vice president, Byrne Organization, Inc., Washington, D. C.

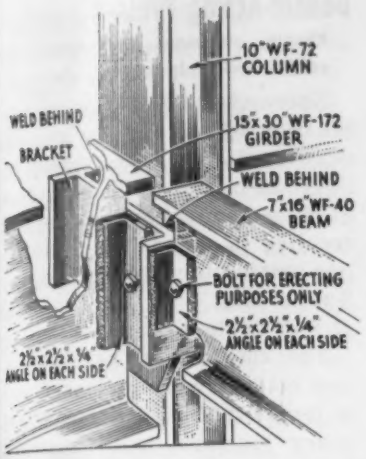


FABRICATORS and erectors at Edgewater Apartments, Cleveland, used steel bar joists set on 24 in. centers and welded in position. Des Moines Steel Co., Pittsburgh, handled fabrication.

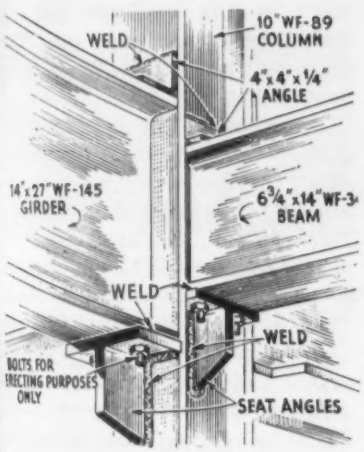


TYPICAL beam-to-column connections, simplified by welding, eliminate costly angles, speed erection.

Costs Down—Labor costs of fabricating and erecting the 11-story Edgewater apartments at Cleveland were cut 5 pct through use of welded design. Simpler details also cut an estimated 25 pct



UNIQUE beam-girder-column connection. Bracket is cut from 21 in. WF 112 "I" beam. This offsets the beam from the center line of the column.



SEAT ANGLE shown at right of typical beam and column connection cut from 21 in. WF 96 "I" beam and fillet welded to column web. Seat angle at left welded to column flange is cut from 14 in. WF 43 "I" beams. Bolts are used for erection only.

from the weight of connections by eliminating splice plates. An overall 3 pct reduction in total weight of the 1200-ton framework resulted.

In basic design, special care was taken that all connections welded by the shop fabricator be in downhand position. This assured fast, low cost fabrication yet permitted flat position field welds on practically every joint. Some typical weld designs used in welded structures are shown in the drawings. Designs were gathered by Lincoln Electric Co., Cleveland, from recently constructed buildings.

Luminous Radiation:

Industry and science cooperate in study at Dutch steelworks.

A group study of luminous radiation of flames, in progress at the Royal Netherlands Steelworks, Holland, since 1949, was recently joined by the United States. The study is being made by scientists and engineers from France, Holland, Sweden and the United Kingdom.

Furnace designers can predict, with fair accuracy, non-luminous radiation but have been handicapped by lack of information on luminous radiation. This phase will be studied in the full scale furnace at Ijmuiden.

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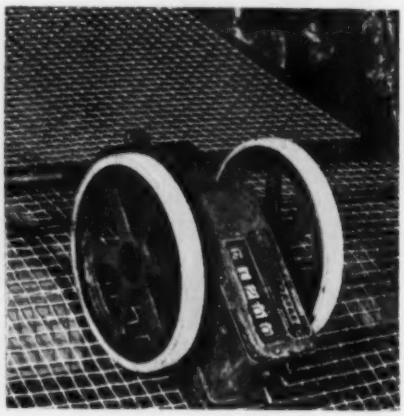
Measuring:

Woven wire counter wheel rims have longer life.

A woven wire fabric producer, stymied with short-lived rubber rims on length counters, recently found the answer to his problem in nylon rims.

Screen wire is packaged for shipment in 100 ft rolls. Rubber rims on the length counter usually lasted 3 weeks, and had to be checked frequently for changes in wheel diameter to guard against errors in length.



NYLON RIMS on woven screen wire measuring wheels have outlasted rubber rims and eliminated constant checking for variance in O.D. Wire is packaged in 100 ft rolls. Rim diameter variations cause differences in roll length of wire screening.

Little Wear—Nylon rims have now been in service more than 7 months with no measurable amount of wear. The rims are made from nylon tubing supplied by The Polymer Corp. of Pennsylvania, Reading, Pa. Additional benefits have been secured through savings in labor and material costs for replacements and through customer satisfaction in obaining full 100 ft rolls.

The rim measures 5.73 in. OD x 5-3/16 in. ID x ½ in. long. It is press fitted on the wheel which is machined to a 0.010 in. larger diameter than the ID of the nylon rim. A straight knurl is also put on the wheel to further hold on the rim. The nylon rims are now being used on galvanized wire without difficulty.

Double-Acting Press:

Rheem combines hot-cupping and cold-drawing in making shells.

Successful use of a unique combination of hot cupping and cold drawing 81 mm mortar shells, believed to be the first combined use of these two processes in the U. S. resulted in an additional $10 million ammunition order recently for Rheem Mfg. Co's. ordnance plant at San Pablo, Calif.

The combination hot - cupping and cold-drawing process is said to required 50 pct less manganese, fewer machine tools, especially lathes, and less heat treating.

Use 2½-in. Rounds — Although 2½-in. shell quality 1010 steel rounds are more ideally suited to the process, 2 15/16 in. rounds are more readily available and currently being used although they must be water-shipped from Sparrows Point.

One boon to Rheem in manufacture of heavy cartridge cases is a new type double acting hydraulic horizontal press made by Clearing Machine Co., Chicago. Cases will be made from 9/16 in. discs to 0.045-in. thick cartridge cases. This new press, chute fed, performs pre-cup, cupping, four draws and one taper operation at a rate of 200 to 400 per hr.

Unlike vertical units the presses are shipped completely assembled as tested and require only light foundation work because load is spread.

"Claims it's cheaper than air conditioning."

Transportation Problem:

Big aircraft assembly tools go to Texas by trailertruck.

Highway transportation supplied the answer to an unusual shipping problem at Glenn L. Martin recently. Ten welded steel tube airplane wing fixtures, too big for plane or railroad, were shipped from Baltimore to a subcontractor, Intercontinental Mfg. Co., Texas. Each fixture weighs 18,000 lb, and is 51 ft 8 in. long, 14 ft. 4½ in. wide and 10 ft 5¼ in. high.

The fixtures are used to build outer wing panels for the U. S. Navy's Martin P5M-1 Marlin antisubmarine seaplanes. The "tools" had to be built complete in Baltimore and shipped whole to Texas.

TOO BIG for plane or rail shipment, Glenn L. Martin sent ten big wing assembly fixtures over the road to Texas. On trailer, gross load came to 55,000 lb and bumper-to-bumper length 74 ft. Truck at this crossing near Somerville, Tenn., almost didn't make it. Going was easier in West.

Size A Problem — No airplane available could handle the tools because of their size. Low tunnels ruled out the railroads. That left the highways as the only solution.

The loads would be overweight —and State Highway Commissions take a dim view of overweight trucks. even on defense work hauls. Going through the mountains of Virginia and Tennessee would present many hazards for even the most skillful driver—90° turns in villages and cities, bridges that would have to be skirted because they couldn't hold the weight or were too narrow and not-too-well-paved country roads on probable detours being among the worst.

E. J. Gallagher and Sons, heavy hauling contractors, Philadelphia, evolved a circuitous route that bypassed road hazards.

● You can find the answer to your special fastener problems in a Circle (B) bolt designed and made for your job. We'd like to show you how these special fasteners can add strength to your products while simplifying design and production problems. Follow the lead of well known producers who agree that "the best start to end fastener problems is to call in Buffalo Bolt."

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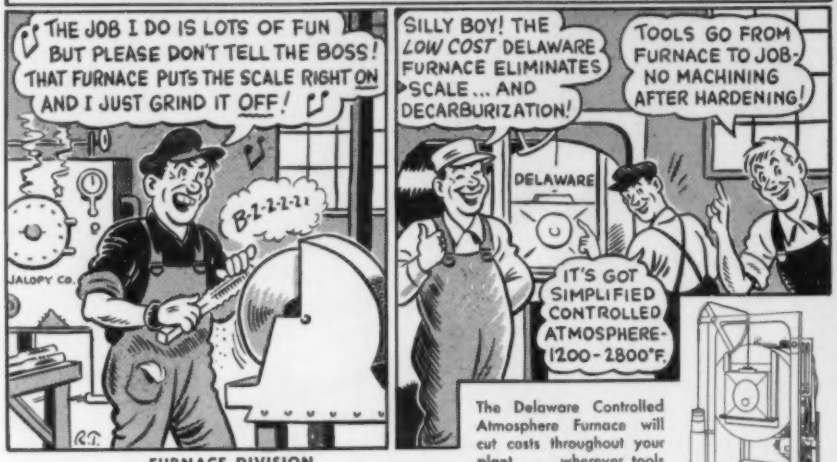
THE JOB I DO IS LOTS OF FUN BUT PLEASE DON'T TELL THE BOSS! THAT FURNACE PUTS THE SCALE RIGHT ON AND I JUST GRIND IT OFF!
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JALOPY CO.
SILLY BOY! THE LOW COST DELAWARE FURNACE ELIMINATES SCALE ... AND DECARBURIZATION!
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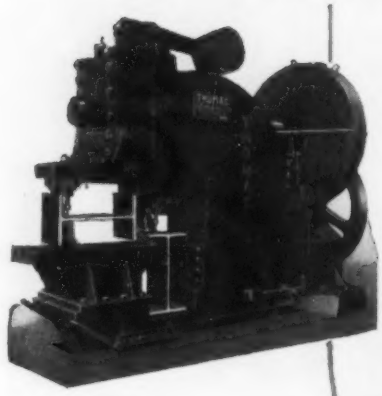
without tool change



The NEW Thomas Beam Punches are built in sizes to handle beams up to 12"-18"-24"-30" and 36", web and flange punching, with a single tool set-up. Any of the five sizes may be used with or without a Thomas spacing Table, depending on production needs.

Write for detailed information

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MACHINE MANUFACTURING COMPANY
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PUNCHES • SHEARS • PRESSES • BENDERS • SPACING TABLES

22

—Technical Briefs—

Maintenance:

Crane truck with boom simplifies handling overhead lights.

Maintenance has gone over with a "boom" at the new plant of Caterpillar Tractor Co., Joliet, Ill., where an electric crane truck is used for maintenance of overhead lighting equipment.

A 6,000 lb capacity Yale electric crane truck equipped with an articulated platform can position boom and platform for overhead work above machine tools and other obstacles and for outdoor maintenance.

OUTDOOR AND INDOOR maintenance is simplified with this crane and boom arrangement at Caterpillar Tractor Plant. Working from platform, maintenance man reaches high spots easily.

Maintenance man and material are picked up by lowering boom and platform to the floor. Positive mechanical linkage on the boom keeps the platform parallel with the floor, regardless of boom elevation. The boom can be extended up to 19 ft and swung in a 27° arc.

Turn Page

seeing is believing with this new ACME Greaseless Composition

Just hold that handy tube against the wheel and Acme Greaseless Composition heads right up in a good heavy layer—dries almost immediately—with practically no composition wasted.

And you get a quality finish every time with this latest addition to the complete line of H-VW-M compositions. Whether you're cutting or polishing ferrous metals, deburring, or satin-finishing, you'll get the same excellent results—all due to the inflexible standards of H-VW-M quality control. Abrasive grading is rigidly controlled. Multiple separation and sifting of particles ensures all-over uniformity—a consistent size abrasive—and guarantees the finest finish possible.

Top-quality compositions are only one result of H-VW-M's constant progress for more than eighty years. It's a continuous policy, best summed up by the word Platemanship—your working guarantee of the best that industry has to offer, not only in compositions, but in every phase of plating and polishing. ® 8434

For technical information on buffing compositions ask for Bulletin C-100.

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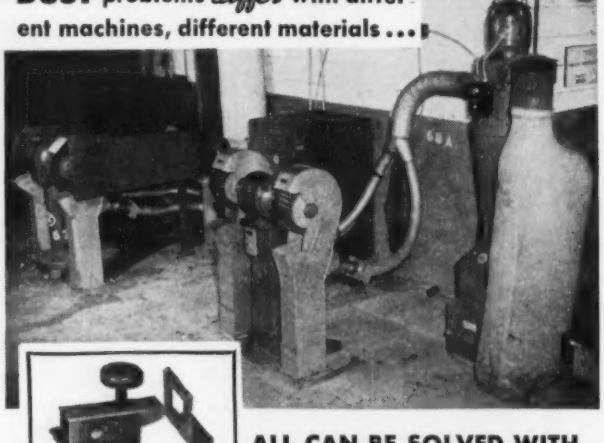
DUST problems *differ* with different machines, different materials . . .



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ALL CAN BE SOLVED WITH CABINET OR CYCLONE TYPE TORIT DUST COLLECTORS

Here adjoining machines present differing dust collecting problems. At the left is a belt grinder with its metal and abrasive particles. Its dusts are eliminated by a cabinet type Torit Dust Collector.

At the right a cyclone type Torit Dust Collector efficiently handles the lint and dusts from a double-end, 12" x 5" wheel, polishing stand.

Torit manufactures cyclone and cabinet type dust collectors in many models, so that the best for your particular problem can be put to work for you. Write today for complete information and latest Torit catalog.

TORIT MANUFACTURING CO. 277 WALNUT STREET ST. PAUL 2, MINN.

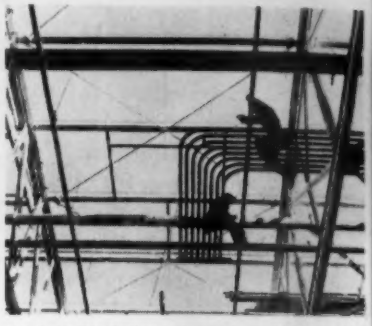
—Technical Briefs—

Heating Problem:

Buick engineers hang heating units from ceiling of new plant.

Engineers hung the heating system for Buick Motor's new Flint, Mich., plant from the ceiling to solve a tough in-plant heating problem.

Metal machining operations in the building involve vaporization of cutting oils. This results in a deposit of oil and dust on unit heaters, causing an almost immediate drop in heat output and eventually requiring a cleaning that might interfere with production.



VAPORIZATION of cutting oils in machining operations made this overhead "ceiling radiator" necessary in Buick's new Building 36 at Flint, Mich. Oil and dust cannot foul heaters, cut heat transmission.

Overhead System—To find the solution, engineers specified a simple overhead heating system of exposed pipes. Through parallel runs of wrought iron pipe, totaling more than 75 miles in length, hot water is circulated. The parallel runs make up a giant ceiling-hung radiator.

Coil water temperature is controlled from another building, where an indicator records outside temperature, as well as heat exchanger inlet and outlet temperature. The heat exchanger outlet temperature is varied inversely with the outside temperature according to a linear chart relationship. This is entirely manual. The size of the piping limits the water temperature to 200°F with the steam valve full open.

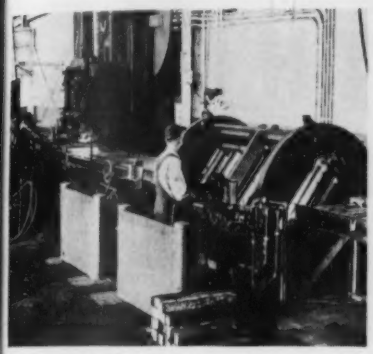
The system is easily maintained and kept clean, and is out of the way for the extensive remodeling required whenever a new engine design is adopted. The building, 700 x 1200 ft, covers 19 acres.

Two In One:

Brass mill combines cropping and inspection of cast brass bars.

Cropping and inspection of cast brass bars before they go to the rolling mill have been combined in one operation at Chase Brass & Copper Co., Waterbury, Conn.

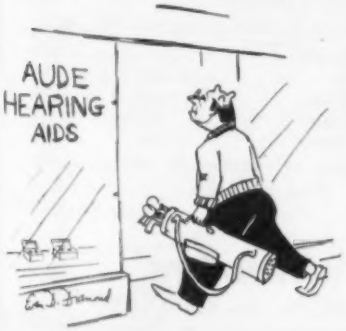
Bars weighing up to 1100 lb are handled on special machinery for the combined operation. After inspection the stock is rolled into light gage sheet.



FROM CASTING SHOP brass bars move to cropping table, left. Tail is cropped and bars, 2½ x 25 x 64 in., move to turnover machine. Operators check bars for surface defects before bars are sent to rolling mill.

Tails Cropped—Bars from the casting shop enter the machine by roller conveyer. The heavy duty mechanical shear crops the "tail" from 2½ in. thick bars. The operator inspects the cut cross section of each bar under bright light, then moves it onto a conveyer leading to the bar turnover machine.

Held between heavy rollers the 25 by 64-in. bar is revolved in its cage by the second operator, then moves out on the conveyer to the right. The turnover machine operator inspects the other side of the bar for surface defects before it moves off the conveyer for transportation to the sheet mill.



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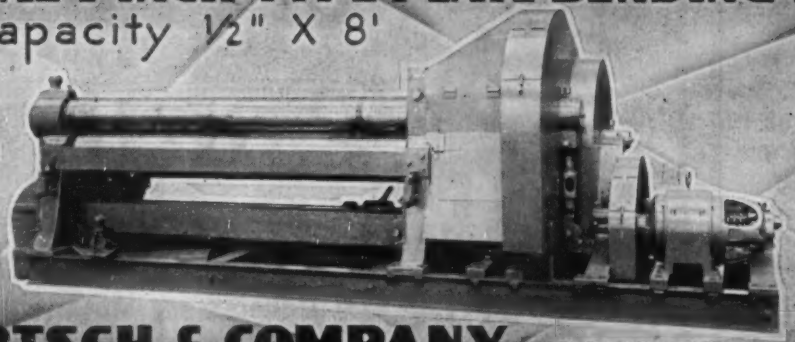

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—regardless of VIBRATION *or* **LOAD**

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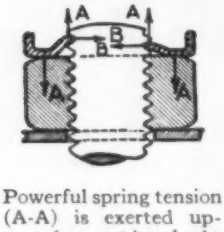
Ordinary nut carries the load — PALNUT keeps it tight with DOUBLE-LOCKING SPRING ACTION



Powerful spring tension (A-A) is exerted upward on the bolt threads and downward on the ordinary nut, while slottedjaws(B-B) close in and grip the bolt like a chuck. Nut can not loosen—bolt can not back out.

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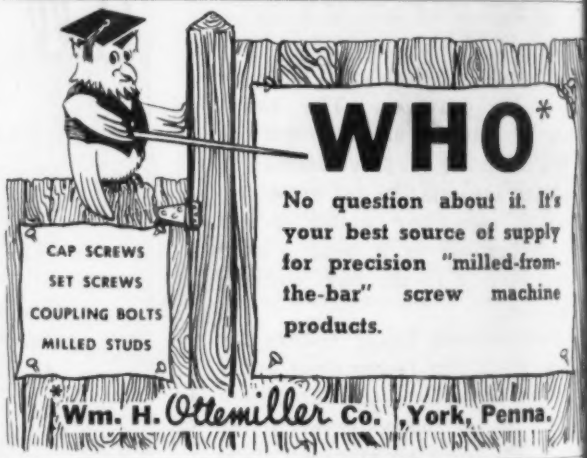

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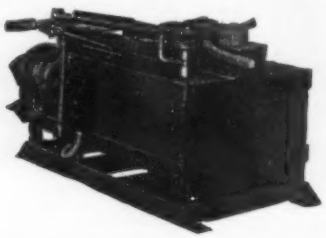

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If you have missed the special Iron Age series of five articles on boron steel which appeared last July and August you may want to order a reprint.

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3. *Hardenability charts.*
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A limited quantity of reprints is still available.
Price 50¢ each.

Address: Reader Service Dept.

The **Iron Age**
100 East 42nd St., New York 17, N. Y.

Pressure Vessel:

Big vulcanizing unit for Goodyear will turn out fuel cells.

A giant pressure vessel, one of the largest vulcanizers ever constructed, has been completed by Adamson-United Co., Akron, Ohio.

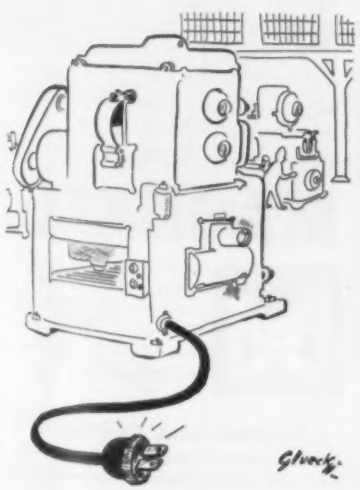
The big pressure vessel, 45 ft in length and 15 ft in diam, and weighing better than 150,000 lb, was delivered to Goodyear Tire & Rubber Co. for production of airplane fuel cells, including those for the Army B-52 jet bomber.

Tore Out Wall—The shell was built under sub-contract in the shops of the Biggs Boiler Works, Akron. Work on the door flanges and the door itself, weighing 47,000 lb, was done in the Adamson-United plant. Part of one wall of the Biggs factory had to be torn down to permit delivery.

Designed to stand an internal pressure of 100 psi, the tank shell is 1 1/16 in. and the head 1⅜ in. thick.

Hydrostatic tests requiring more than 65,000 gal of water, weighing 273 tons, were made in the vulcanizer before delivery. A slide-type door operates vertically in a 35-ft tower on a tongue and groove principle, one half of the door being grooved, the lower half acting as a tongue.

When the door is lowered into closed position, tongues and grooves interlock, with clearance between door and shell flange sealed by a rubber gasket.



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Bench Style	$250.00
Johnson No. 654 Pedestal Style	$150.00
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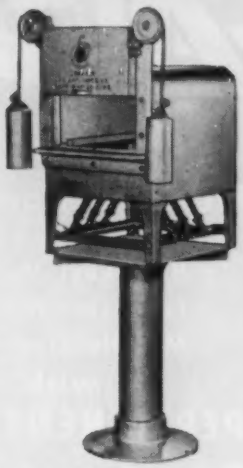

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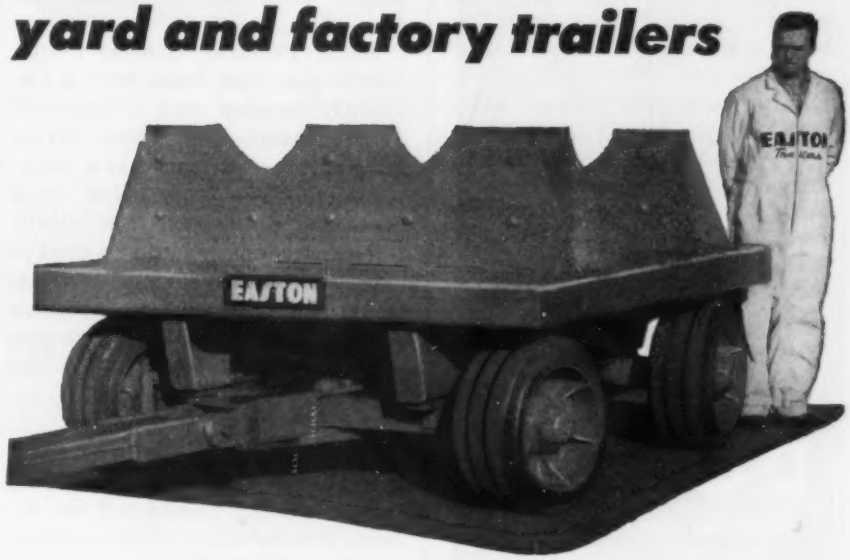

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—Technical Briefs—

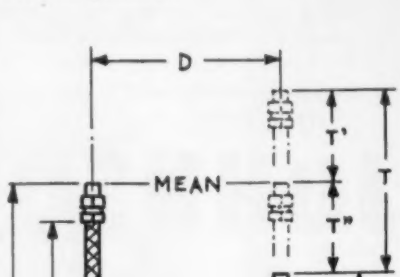
Flexible Metal Hose:

Hose life longer if simple installation rules followed.

Installations of flexible metal hose on machinery can be made to last longer in service by using some simple installation rules.

Sufficient hose length should be provided to avoid sharp bends at fittings, according to Titeflex, Inc., Newark, N. J., hose manufacturer. Overall length of hose can be calculated from the formula:

Overall length (L) = $1\frac{3}{4}$ D + C + T′ where D is the bending distance, C the coupling factor, and T′ or T″ is the hose travel, whichever is greater.

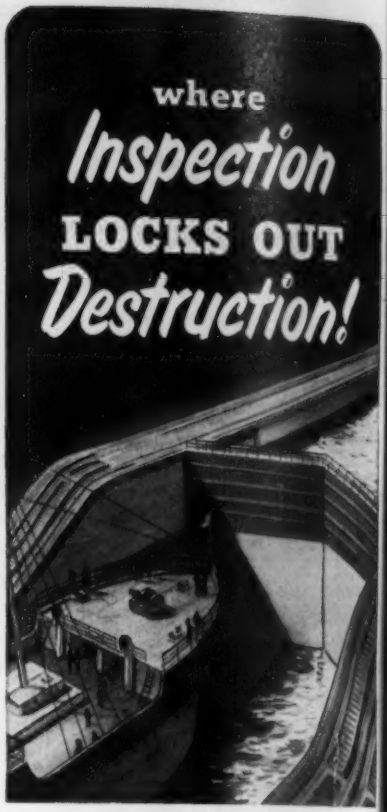


PROPER INSTALLATION of flexible metal hose on machinery gives longer life. Proper length is important and twisting and compression during installation injure hose.

Avoid Twisting—Unless proper care is exercised, metal hose is frequently twisted and compressed during installation. These forces deform braid strands and eventually the hose supporting braid breaks with subsequent hose failure.

Two wrenches should be used to avoid twisting during installations. Undue strain and twisting can be avoided by making certain that flexing of the hose takes place in one plane only.

Support Long Lengths—Recommended bending radius for each hose diameter should not be exceeded. Long runs of hose continually flexing near fittings should be supported.



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Gas Turbines:

May prove cheapest power source for gas pipeline pumping.

Gas turbines may prove the cheapest and most efficient source of power for gas pipeline pumping, J. O. Stephens, development engineer, Westinghouse Electric Corp., Steam Div., recently told members of the Natural Gas Assn. in Los Angeles.

First experimental gas turbine for land application, built by Westinghouse, was installed in 1949 in Wilmar, Ark., on the Mississippi River Fuel Corporation's gas line.

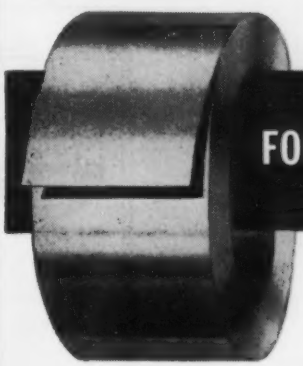
Two gas pipelines, one powered by reciprocating engines and the other by gas turbines, recently were compared. A 26-in. pipeline powered with gas turbines was found to deliver the same amount of gas more economically than a 30-in. line powered with conventional reciprocating engines.

Lower Investment — The 26-in. pipeline, powered with gas turbines, required about $8 million less capital investment and 64,500 fewer tons of steel to build. Annual cost for the line was reduced by about $1,360,000 or 0.8¢ per thousand cubic feet of gas pumped.

Unlike the reciprocating engine, Mr. Stephens explained, the gas turbine lends itself to driving a high speed centrifugal compressor for gas compression.

PROTECTION FROM GASES and metallic fumes during welding operations in the plate shop, South Works, Wyandotte Chemicals Corp., Wyandotte, Mich., is assured with special mask developed by Mine Safety Appliance Co., Pittsburgh. Mask works in non-explosive, gaseous areas where mechanical exhaust-type ventilation is impractical. Mike Pavlich, Safety Dept., shows Walter Bednarek how it works while Jack Elliott, plate shop superintendent looks on.

typewriters tables & time-saving



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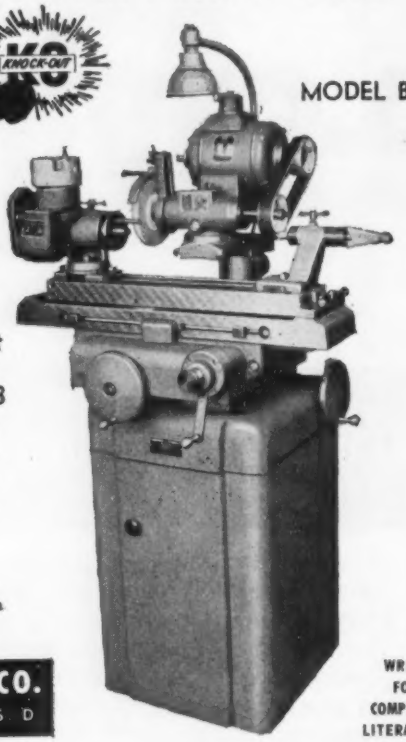

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Steel Negotiators Press for Early Settlement

Pressure of unemployment convinces all parties time has run out . . . Wage package set . . . Only union shop remains to be ironed out . . . Price accord reached months ago.

The worst steel strike in history, in its seventh week, has passed the point of no return. The many defense and civilian manufacturing plants that have been shut down as steel supplies became exhausted will not be able to resume production for several weeks after the strike ends. Many other plants still operating will have to be shut down even if the strike is settled this week.

Steel inventories, which some manufacturers worked 2 years or more to build, have been wiped out. It will not be possible to resume operations until at least some new inventory has been accumulated. Even consumers with the highest priority can not expect steel shipments for 2 weeks or more after the strike's end. The outlook now is that the steel market will probably be tight until mid-1953.

Overriding Priority — Military and atomic energy customers will get first call on all steel produced. Government representatives have already invaded steel plants which are now operating to expedite the flow of steel where it is needed most urgently. In some cases the highest priority has been used in an attempt to direct the same steel to more than one use.

Such overriding directives have already made the Controlled Materials Plan inoperative from a practical viewpoint. It will be many weeks before CMP tickets are worth much more than the paper they are printed on. Steel producers fear overriding directives because they (1) strike suddenly without warning, (2) foul up production schedules and (3) cause strained relations with old non-defense customers who have been promised steel as soon as production is resumed.

Callous to Crisis — The public has become so inured to crisis that only those directly affected by the disaster are sounding off. Plant shutdowns — both military and civilian—have become so numerous that announcement of new closures causes hardly a ripple. Unemployment resulting from the strike has reached the staggering total of more than 1.5 million workers. About one-third of these are steelworkers. Unemployment in the auto industry has passed the 300,000 mark. The balance of unemployment is in iron and coal mining, transportation, manufacturing plants, and miscellaneous industries.

The iron ore supply outlook is desperate. Shipping losses have already mounted so high that some blast furnace shutdowns may be inevitable next spring. This was one of the subjects discussed in the fruitless negotiations in Pittsburgh last weekend. Ore shortages are an outstanding example of how the economy will suffer from the lingering malady of strike long after the steelworkers have returned to their jobs.

Time Running Out — Intense pressure for settlement is being felt on all sides. The financial drain on companies will show up on balance sheets later this year. Steelworkers, their savings exhausted, have been forced to apply for relief.

Strangely enough there is little left to predict about the outcome of the strike—except its time of ending. The industry has already offered a 16¢ per hr wage increase plus fringes amounting to about 5.4¢ per hr. It has satisfied the union demands on holidays, vacations, shift differential and southern pay differential. The only big issue remaining is the bitterly-argued one of the union shop. USW's Murray rejected a fair offer of union security despite objections of his two top lieutenants.

Union Shop Clause—If an agreement is reached this week or next here's how the union shop issue might be resolved: (1) New employees would sign union shop applications to be held by the company. (2) The "get out" period would be between the 15th and 30th day instead of the 20th and 30th day. (3) The applications would remain with the companies and no notification would be given the union until the worker had had an opportunity to withdraw the application. (4) Old employees would not be compelled to join.

Prices All Set—The steel price increase has been pretty well agreed upon for many weeks. As has been pointed out repeatedly by THE IRON AGE, it will be around $5.25 a ton.

Although last weekend's negotiations collapsed without agreement, the principals tried very hard to reach a settlement. Because of the urgency every effort was being made to end the deadlock. Neither side could afford to let the strike last much longer.

Loss Climbs—By the end of this week steel losses will total about 15.1 million net tons. Even if the strike is settled this week the eventual loss will mount close to 18 million tons. Damage to furnace linings will complicate the situation.

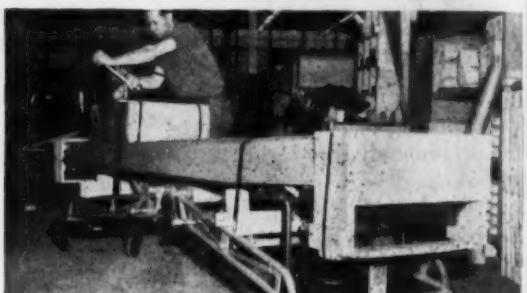
Steelmaking operations this week are scheduled at 15 pct of rated capacity, up half a point.

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Saves time, money, materials, too!

ARMY RATIONS REACH KOREA. South Korean longshoremen at Pusan unload cartons protected by steel strapping. Government specifications require this protection for all boxes bound for overseas. Goods arrive safe and sound despite countless handlings from manufacturer to depot to base.

TIES UP TIES. The Southern Railway scooped up 180,000 ties from an unused stretch of track, tied them in convenient bundles with Acme Steel strapping for easy loading, shipping, tallying and storing.



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Market Briefs

More Shutdowns—Shortage of seamless steel tubing stopped production of 3.5 in. bazooka rockets at Ford's Highland Park plant. Ford officials have asked for a supply of tubing from Republic Steel Corp. plant in Chicago. If tubing is delivered it will keep bazooka production going for another 18 days. All 15 Ford assembly plants were closed this week, including the River Rouge plant. Only the steel mill and maintenance work continued. Lincoln-Mercury Div. plants planned to operate 4 or 5 days this week.

How Long?—Poll of 200 manufacturing firms by Purchasing Agents Assn. of Chicago shows half will be out of steel by the end of July if the steel strike continues. Fifteen pct said they had enough steel for 45 days and 35 pct reported they could continue operations 60 days or more. More than half felt it would take at least 30 days for steel deliveries to be resumed after the strike ends.

New Pipeline—West Coast Pipeline Co., Dallas, has government approval to build a 953-mile crude oil pipeline from Wink, Tex., to Norwalk, Calif. Completion date is set as Sept. 30, 1953. With costs estimated at $79.5 million, the line would move 100,000 bbl per day through 24-in. pipe. If company increases investment to $105.7 million, line would move 300,000 bbl per day.

More Copper—New mining facilities in Arizona, slated to be in production by 1957, are expected to produce 140 million lb of copper and 6 million lb of molybdenum annually. Reconstruction Finance Corp. issued its biggest private business loan, $94 million, to San Manuel Copper Corp., Superior, Ariz., to aid the production expansion. Output of the new facilities is expected to raise U. S. copper production 8 pct and molybdenum 16 pct above 1951 totals.

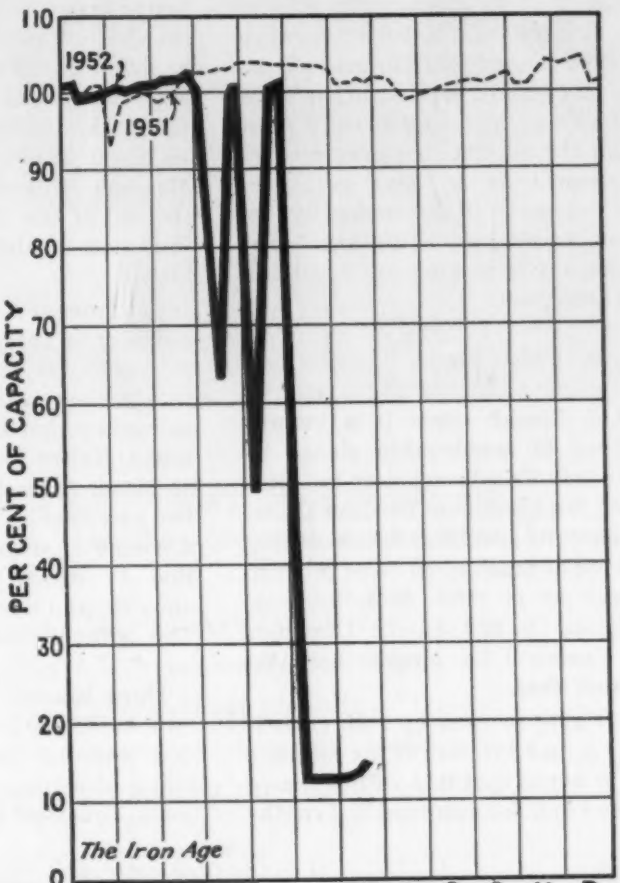
Suspended Duty—Suspension of import duties on scrap metals, except lead, will continue until June, 1953. Continuation was authorized this week when President Truman signed H. R. 6845.

No Red Sales—Reports that Pakistan had engaged to purchase 112,000 net tons of Russian steel during the Moscow Economic Conference have been denied by Pakistan delegates. Russia made the offer but was turned down.

Judging by Noise—Steel mill officials say they have had few complaints from appliance customers since the steel strike started. As a result they do not expect heavy orders from appliance people after the strike is settled. Automakers have been very vocal, however, and are expected to place maximum orders. Reason: Appliance inventories are thought to have been high at the beginning of strike while automakers had depleted their inventory with stepped-up production.

Press Order — Hydropress, Inc., New York, received an order for new forge shop installation at the Green River Steel Corp., Owensboro, Ky. Main units in the order are a 2500 ton upsetting press and a 1500 ton hydraulic press. The plant will process steel ingots up to 12,000 tons for subsequent rolling.

Steel Operations



District Operating Rates—Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	West	Buffalo	Cleveland	Detroit	Wheeling	South	Ohio River	St. Louis	East	Aggregate
July 6	8.0	5.5	11.8	16.0	28.0	0.5	0.0	42.0*	50.0	3.5	33.0	31.0*	14.0	14.5
July 13	8.0	5.0	11.0	16.0	28.5	0.5	0.0	44.0	51.0	3.5	37.0	68.0	14.0	15.0

Beginning Jan. 1, 1952 operations are based on annual capacity of 108,587,670 net tons.
* Revised.

Alcoa, AFL Sign 5-Year Contract

Boost is 10 pct plus 4c each year . . . Includes escalation, other fringes . . . No union shop . . . Third round expansion to wait . . . Announce new IMC allocations—By R. L. Hatschek.

Close to 30 pct of Aluminum Co. of America's hourly paid employees have come to agreement with the company. The Aluminum Workers Union (AFL) signed a 5-year pact last week that gives them a 10 pct wage increase retroactive to Mar. 15 plus a 4¢ per hour boost each year starting July 1, 1952. Escalation is tied to the Bureau of Labor Statistics commodity price index.

Fringes include better vacation deals, higher shift premiums, insurance and hospitalization benefits. Fringe agreements run 2 years and the escalation clause may be reopened at 30 days notice by either party if the commodity index reverses its rising trend. The company is seeking price relief in Washington.

No Union Shop—The new contract says nothing about a union shop though there is a maintenance of membership clause included. This is not new to Alcoa and the Aluminum Workers Union. Generally speaking, the union shop is not as much of an issue in aluminum as in steel. Both Reynolds Metals Co. and Kaiser Aluminum & Chemical Co. already have the union shop.

Highly favored by both sides is the 5-year duration of the contract. It is hoped that this will become a trend in labor agreements. Lengthy contracts give the workers additional security as well as assuring continued production.

Settlement with the United Steel Workers is still waiting agreement in the steel industry.

Production — Industry turned out 80,804 tons of aluminum in May, exceeding the 76,880-ton total of the previous month by better than 5 pct. June production dropped off somewhat as a result of severe storm damage at Alcoa's Massena plant. When the final figures are in the June total will be about 78,000 tons. Repairs at Massena will be finished near the end of this month after about 7500 tons of aluminum have been lost.

But from now on, the aluminum industry is going to produce at a rate of better than a million tons yearly. New potlines are coming in so rapidly that they're difficult to count. Kaiser has just added one at Mead, Alcoa has been running two new ones at Point Comfort for a couple of months and the first line at Wenatchee was started June 26. And Reynolds is busy, too. This is the big year for aluminum.

Third Round—Defense Production Authority told THE IRON AGE that while all aspects of a third round of aluminum expansion are being considered it will take a long time before a decision can be reached. The agency will go along with recommendations of the Congressional Joint Committee on Defense Production and canvass industry before choosing any firm or firms to handle expansion—if expansion is decided on.

Zinc Output—Slab zinc smelter production for the month of June totaled 77,210 tons as compared to 84,188 tons in May. This brought the total for the first half of 1952 to 489,938 tons for an average daily output of 2692 tons. Highest daily average for an entire year was 2663 in 1943 when the total hit 971,873 tons.

Shipments in June totaled only 47,125 tons, a drop of 27,540 tons from the preceding month. This skid, of course, was caused by the steel strike and lack of galvanizing during the period. Result is a stock total at the start of July of 63,031 tons, nearly double the previous month and the highest total since the start of hostilities in Korea.

Copper Steady— Production of refined copper inside and outside the U. S. by members of the Copper Institute totaled 206,660 tons in June, very near the May figure of 207,266 tons. Domestic output, however, was off about 5000 tons to 92,151 tons for the month. This was offset by a 7000-ton dip in domestic deliveries to fabricators for 98,416 tons in the same period. Stocks climbed 15,505 tons to 70,856 tons, highest since the beginning of the year.

Nickel, Cobalt — International Materials Conference announced third quarter nickel and cobalt allocations of 40,322 tons and 2728 tons, respectively. Of these totals, the U. S. will receive 27,145 tons of nickel and 1745 tons of cobalt.

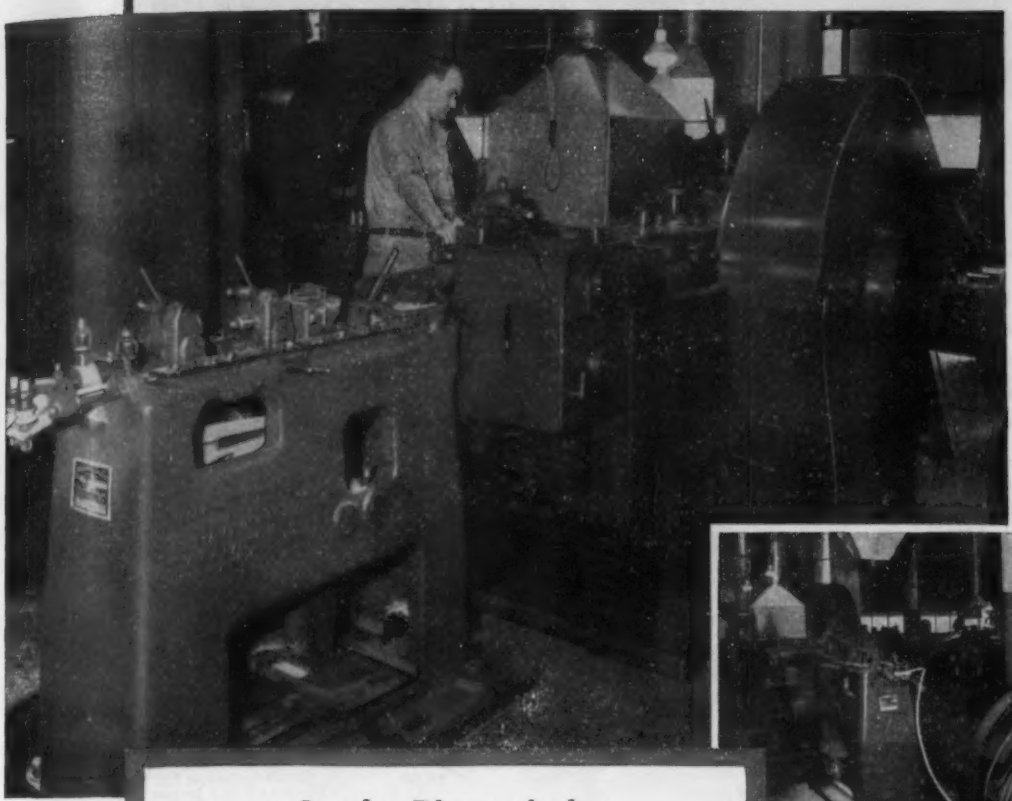
U. S. allocations for the same period include 405,756 tons of copper, 2574 tons of tungsten and 4540 tons of molybdenum.

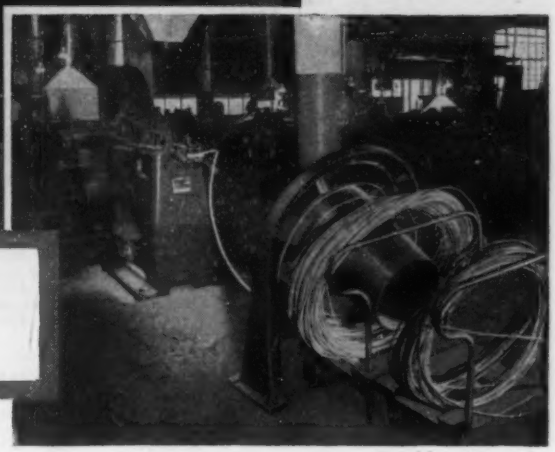
NONFERROUS METAL PRICES

	July 9	July 10	July 11	July 12	July 14	July 15
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered ...	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	....	$1.215	$1.215
Zinc, East St. Louis	15.00	15.00	15.00	15.00	15.00	15.00
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

Wire Drawers Make Bolt Heading Easier





In the Plant of the Lake Erie Screw Corporation

Ajax-Hogue Wire Drawers coupled with bolt headers improve the rate and quality of production while at the same time they effect other substantial savings.

The exactness of size, straightness and easier workability of clean, freshly drawn, freshly coated wire are factors which lessen the down time and greatly extend the life of the header die. These savings plus the additional saving in cost between hot rolled rod and more expensive mill drawn wire are achieved by many bolt manufacturers throughout the country by using Ajax-Hogue Drawers.

Write for Bulletin No. 111 for more complete information.

THE AJAX MANUFACTURING COMPANY
EUCLID BRANCH P. O. CLEVELAND 17, OHIO
1110 S. DEARBORN ST. CHICAGO 3, ILLINOIS
DEWART BUILDING NEW LONDON, CONN.

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 30.1¢; 4S, 61S-O, 32¢; 52S, 34.1¢; 24S-O, 24S-OAL, 32.9¢; 75S-O, 75S-OAL, 39.9¢; 0.081 in., 2S, 3S, 31.2¢; 4S, 61S-O, 33.5¢; 52S, 35.6¢; 24S-O, 24S-OAL, 34.1¢; 75S-O, 75S-OAL, 41.8¢; 0.032 in., 2S, 3S, 32.9¢; 4S, 61S-O, 37.1¢; 52S, 39.8¢; 24S-O, 24S-OAL, 41.7¢; 75S-O, 75S-OAL, 52.2¢.

Plate ¼ in. and heavier: 2S, 3S-F, 28.3¢; 4S-F, 30.2¢; 52S-F, 31.8¢; 61S-O, 30.8¢; 24S-O, 24S-OAL, 32.4¢; 75S-O, 75S-OAL, 38.8¢.

Extruded Solid Shapes: shape factors 1 to 5, 36.2¢ to 74.5¢; 12 to 14, 36.9¢ to 89¢; 24 to 26, 39.6¢ to $1.16; 36 to 38, 47.2¢ to $1.70.

Rod, Rolled: 1.5 to 4.5 in., 2S-F, 3S-F, 37.5¢ to 33.5¢; cold finished, 0.375 to 3 in., 2S-F, 3S-F, 40.5¢ to 35¢.

Screw Machine Stock: Rounds, 11S-T3, ⅛ to 11/32 in., 53.5¢ to 42¢; ⅜ to 1½ in., 41.5¢ to 39¢; 1 9/16 to 3 in., 38.5¢ to 36¢; 17S-T4 lower by 1.5¢ per lb. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 39.5¢ to 29¢; 52S, 48¢ to 35¢; 56S, 51¢ to 42¢; 17S-T4, 54¢ to 37.5¢; 61S-T4, 48.5¢ to 37¢; 75S-T6, 84¢ to 67.5¢.

Extruded Tubing, Rounds: 63S-ST-5, OD in in.: 1¼ to 2, 37¢ to 54¢; 2 to 4, 33.5¢ to 45.5¢; 4 to 6, 34¢ to 41.5¢; 6 to 9, 34.5¢ to 43.5¢.

Roofing Sheet, Flat: 0.019 in. x 28 in. per sheet, 72 in., $1.42; 96 in., $1.522; 120 in., $1.902; 144 in., $2.284. Gage, 0.24 x 28 in., 72 in., $1.379; 96 in., $1.839; 120 in., $2.299; 144 in., $2.759. **Coiled Sheet:** 0.019 in. x 28 in., 28.2¢ per lb; 0.024 in. x 28 in., 26.9¢ lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅞ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	73	58½
Angles, hot-rolled	73	58½
Plates	75	59½
Seamless tubes	106	93½
Shot and blocks	..	53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52	....	45.12
Copper, h-r	....	41.37	....
Copper, drawn	....	42.62	....
Low brass	42.34	42.03	....
Yellow brass	40.17	39.86	....
Red brass	43.10	42.79	....
Naval brass	44.72	38.78	40.04
Leaded brass	....	....	38.82
Com'l bronze	44.39	44.08	....
Mang. bronze	48.44	42.83	43.89
Phos. bronze	64.72	64.97	....
Munts metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	....

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	19.00
Aluminum pig	18.00
Antimony, American, Laredo, Tex.	39.00
Berryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.35
Cadmium, del'd	$2.25
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$200
Lead, St. Louis	15.80
Lead, New York	16.00
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$192-195
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	82.75
Tin, New York	$1.215
Titanium, sponge	$5.00
Zinc, East St. Louis	15.00
Zinc, New York	15.83
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 10,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	19.5
No. 12 alum. (No. 2 grade)	18.5
108 alloy	19.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASX-679	19.5
Steel deoxidizing aluminum, notch-bar granulated or shot	
Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.84
Electrodeposited	33¾
Flat rolled	36.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.40
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn.	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	20½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ⅛¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19¾	17¾
Red brass	20¾	19¾
Comm. bronze	20½	19¾
Mang. bronze	18¾	17¾
Brass rod ends	18¾	....

Custom Smelters' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	16.50
Radiators	17.25*
* Dry copper content.	14.75

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	18.50
Brass pipe	18.50
Radiators	14.75
Aluminum	
Mixed old cast	9 — 9¾
Mixed new clips	10 —11
Mixed turnings, dry	9 — 9½
Pots and pans	8½— 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14 —14¼
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	11½—12
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½
Aluminum	
Alum. pistons and struts	6 — 6½
Aluminum crankcases	7 — 7½
2S aluminum clippings	10
Old sheet and utensils	7 — 7½
Borings and turnings	5 — 6
Misc. cast aluminum	7 — 7½
Dural clips (24S)	7 — 7½
Zinc	
New zinc clippings	8
Old zinc	6
Zinc routings	3 — 3½
Old die cast scrap	5 — 5½
Nickel and Monel	
Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13
Lead	
Soft scrap, lead	12 —13¼
Battery plates (dry)	7 — 7½
Batteries, acid free	4 — 5
Magnesium	
Segregated solids	15 —16
Castings	14 —15
Miscellaneous	
Block tin	100 —110
No. 1 pewter	70
No. 1 auto babbitt	55 —60
Mixed common babbitt	14½—14¾
Solder joints	19 —20
Siphon tops	60
Small foundry type	19 —19½
Monotype	15½—16
Lino. and stereotype	15½—16
Electrotype	13 —13½
Hand picked type shells	9¾—10
Lino. and stereo. dross	7
Electro. dross	6¼

• NON-FERROUS METALS
• ORES AND MINERALS
• METALLIC RESIDUES
• METAL SCRAP
• FERRO ALLOYS
Phibro
MANGANESE ORE
CHROME ORE
TUNGSTEN ORE
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Dealers Start Feeling Better

Expect end of steel strike soon, with price rise to follow . . . Distaste for under-ceiling sales grows . . . Fairless Works facilities are swamped by shipments.

Scrap men appeared optimistic this week as the market started to firm. Reason was a hope for an early settlement of the steel strike with a subsequent resumption of buying by the mills.

Prices remained below ceiling in the East, but dealers expected a rise in the market soon. Shipments to the Fairless Works were stopped when unloading facilities were swamped by the volume.

In the Midwest reluctance to sell below ceiling was spreading, though sales were very sluggish in most areas. Resumption of operations at Granite City Steel Co. should give the scrap market in the St. Louis district a welcome shot in the arm.

Threat of an iron ore shortage firmed the market for blast furnace grades in Detroit, where shutdown of auto plants has virtually halted scrap generation.

General feeling across the country was that prices were sure to go up as soon as the steel strike ended. And scrap men seemed to feel this happy day was near at hand.

Pittsburgh—The market was beginning to show signs of bullishness. Some of it may be due to wishful thinking that end of the strike will automatically inject strength into the picture. Some observers pointed out that stocks in hands of consumers are high, that considerable tonnage is on track waiting for the mills to reopen. Two sales, reported earlier, called for under-ceiling prices on openhearth grades. The turnings market is showing strength.

Chicago—While dealers were still laying down scrap here last week, collections of industrial and agricultural scrap were at a low point. A combination of low prices and low industrial activity were blamed. Orders were still being placed but there was more uneasiness in the market. Some scrap was being shipped out of the area, but considerable freight was being absorbed.

Philadelphia—Scrap market is quiet with dealer intake at a very low level. Shipments to the Fairless Works proved so heavy that they were temporarily held up. Unloading equipment just wasn't adequate. Cast grades are holding steady with new sales at the $39 level for cupola grade material. Talk in the trade was getting optimistic as it was felt the strike should be over soon. But prices held below ceiling.

New York — With Fairless Works temporarily halting shipments of openhearth scrap because of swamped loading facilities, the market here slipped deeper into its strike rut of inactivity. There was some talk of stiffening prices on No. 1 and No. 2 heavy. The turnings group was stronger pricewise and even cast enjoyed a firming up. All in all some quarters were expecting prices to get up there again.

Detroit — Increasing threat of an impending ore shortage has tightened the market. Blast furnace grades climbed $2 to $3 during the past week. They will probably go higher as reluctance to make below ceiling sales spreads. Cast continues to show more life. Scrap generation in Detroit has come to a near halt as the auto industry approaches a virtual stop.

Cleveland—Aside from the purchase of special No. 2 heavy melting steel by a Valley mill last week no new mill buying was evident in Cleveland and the Valley. However, the scrap market was showing signs of renewed strength and confidence. Dealers were more reluctant to sell below ceilings. Brokers were fearful that below ceiling orders would be bad ones. Reason for this optimism is based on scarcer scrap, less ore, high steel output.

St. Louis — The green light was given scrap shipments by Granite City Steel after it had settled its strike. These orders had been placed at ceiling prices. Hence there will be a scramble for material at prices higher than those which now prevail. This buying will continue from 2 to 3 weeks. Meanwhile other mills must wait before resuming lower-price buying.

Birmingham—Moving of openhearth and blast furnace grades of scrap was again at a standstill in the South this week. Some cast continues to move to local foundries and a little is going north. The city's largest scrap dealer says that while the market apparently is weaker and prices have dropped under ceiling in some cities, the supply is small. Because of the small supply and expected high demand, some dealers expect prices will again rise to ceiling, and since much of their scrap was bought at or near ceilings, most of them hope to hold on to it until this time comes.

Cincinnati—Scrap was being offered freely in this district until last week when things started to tighten up. One major consumer is still filling orders for openhearth grades on a ceiling price delivered base with a $1.50 per gross ton allowance for freight. Below ceiling orders for No. 2 heavy melting steel by another consumer are said to be difficult to fill at the price. Cast was firming up slightly.

Boston—Scrap market remains dull. No increase is anticipated. On the basis of a few sales, price of No. 1 heavy, No. 2 heavy, and bundles has inched past the $30 mark. Scrap men's hope hinges on settlement of the steel strike.

Buffalo — Pessimism over scrap prices prices grew during the week as dealers reported bulging yard stocks fully ample to cover outstanding orders placed shortly before the steel strike. Hints were also heard that prices may skid below present levels if strike goes another week. Dealers report all prices now on nominal basis. Waterfront stocks from Eastern Seaboard are now near the 20,000-ton mark.

West Coast—Western scrap dealers spent most of last week watching the GOP convention on television. Since western ore shipments are not affected by winter no buying splurge to make up for lost ore is expected.

how we measure service

To meet increasingly rigid specifications, today's steel-making operations demand materials of highest quality.

The strict attention given by Luntz in selecting types of scrap peculiar to the individual consumer's needs is the result of a standard that measures service as stringently as a micrometer measures machining.

A constant effort to meet these standards and to improve upon them is the promise of continued leadership by Luntz.

The
LUNTZ
IRON & STEEL CO.

offices CANTON, OHIO · CLEVELAND, OHIO · KOKOMO, INDIANA · DETROIT, MICHIGAN

plants CANTON, OHIO · KOKOMO, INDIANA · WARREN, OHIO · HUBBARD, OHIO

Scrap Prices

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

*Scrap at basing point ceiling. Broker's fee not included.

†Scrap at shipping point ceiling. Broker's fee not included.

Pittsburgh

No. 1 hvy. melting	$39.00	to	$40.00
No. 2 hvy. melting	38.00	to	39.00
No. 1 bundles	39.00	to	40.00
No. 2 bundles	38.00	to	39.00
Machine shop turn.	28.00	to	29.00
Mixed bor. and ms. turns.	28.00	to	29.00
Shoveling turnings	33.00	to	34.00
Cast iron borings	32.00	to	33.00
Low phos. punch'gs, plate			46.50*
Heavy turnings	35.00	to	36.00
No. 1 RR. hvy. melting			46.00*
Scrap rails, random lgth.			48.00*
Rails 2 ft and under			52.00*
RR. steel wheels			51.00*
RR. spring steel			51.00*
RR. couplers and knuckles			51.00*
No. 1 machinery cast			52.00
Cupola cast			42.00
Heavy breakable cast.			45.00
Malleable			50.00

Chicago

No. 1 hvy. melting	$37.50	to	$38.50
No. 2 hvy. melting	37.50	to	38.50
No. 1 factory bundles	41.00	to	42.00
No. 1 dealers' bundles	37.50	to	39.00
No. 2 dealers' bundles	36.00	to	37.00
Machine shop turn.			25.00
Mixed bor. and turn.	28.00	to	29.00
Shoveling turnings	28.00	to	29.00
Cast iron borings	28.00	to	29.00
Low phos. forge crops	50.00	to	51.00
Low phos. punch'gs, plate			45.00*
Low phos. 3 ft and under	43.50	to	45.50
No. 1 RR. hvy. melting			44.50*
Scrap rails, random lgth.			46.50*
Rerolling rails			51.50*
Rails 2 ft and under			50.50*
Locomotive tires, cut			49.50*
Cut bolsters & side frames			47.50*
Angles and splice bars			49.50*
RR. steel car axles			56.50*
RR. couplers and knuckles			49.50*
No. 1 machinery cast	41.00	to	42.00
Cupola cast	39.00	to	40.00
Heavy breakable cast.	35.00	to	36.00
Cast iron brake shoes			41.00†
Cast iron car wheels			47.00†
Malleable	49.00	to	50.00

Philadelphia

No. 1 hvy. melting	$40.00	to	$41.00
No. 2 hvy. melting	38.00	to	39.00
No. 1 bundles	40.00	to	41.00
No. 2 bundles	38.00	to	39.00
Machine shop turn.	29.00	to	30.00
Mixed bor. and turn.	31.00	to	32.00
Shoveling turnings	31.00	to	32.00
Clean cast chem. borings	34.00	to	34.50
Low phos. punch'gs, plate	43.00	to	44.00
Low phos. 3 ft and under	43.00	to	44.00
Low phos. bundles			44.50*
Hvy. trimmings			41.50*
RR. steel wheels			49.50*
RR. spring steel			49.50*
Rails 18 in. and under			52.50*
Cupola cast	38.00	to	39.00
Heavy breakable cast.	41.00	to	42.00
Cast iron carwheels			47.00†
Malleable			55.00†
Unstripped motor blocks	34.00	to	35.00
Clean auto cast.	45.00	to	46.00
Charging box cast.	39.00	to	40.00

Cleveland

No. 1 hvy. melting	$39.00	to	$40.00
No. 2 hvy. melting	36.00	to	37.00
No. 1 busheling	39.00	to	40.00
No. 1 bundles	39.00	to	40.00
No. 2 bundles	36.00	to	37.00
Machine shop turn.	25.00	to	26.00
Mixed bor. and turn.	29.00	to	30.00
Shoveling turnings	29.00	to	30.00
Cast iron borings	29.00	to	30.00
Low phos. 2 ft and under			48.00*
No. 1 RR. hvy. melting			45.00*
Rails 3 ft and under			50.00*
Rails 18 in. and under			53.00*
No. 1 machinery cast	48.50	to	49.50
Cast iron carwheels			47.00†
Stove plate	45.00	to	46.00
Malleable	51.00	to	52.00

Youngstown

No. 1 hvy. melting	$40.00	to	$41.00
No. 2 hvy. melting	37.00	to	38.00
No. 1 bundles	40.00	to	41.00
No. 2 bundles	37.00	to	38.00
Machine shop turn.	26.00	to	27.00
Shoveling turnings	30.00	to	31.00
Cast iron borings	30.00	to	31.00
Low phos. plate			46.50*

Buffalo

No. 1 hvy. melting	$37.00	to	$38.00
No. 2 hvy. melting	37.00	to	38.00
No. 1 bushelings	38.00	to	39.00
No. 1 bundles	38.00	to	39.00
No. 2 bundles	37.00	to	38.00
Machine shop turn.	28.00	to	29.00
Mixed bor. and turn.	32.00	to	33.00
Shoveling turnings	32.00	to	33.00
Cast iron borings	32.00	to	33.00
Low phos. plate			45.50*
Scrap rails, random lgth.			47.00*
Rails 2 ft and under			51.00*
RR. steel wheels			50.00*
RR. spring steel			50.00*
RR. couplers and knuckles			50.00*
No. 1 machinery cast			45.00†
No. 1 cupola cast	40.00	to	41.00
Small indus. malleable			55.00†

Birmingham

No. 1 hvy. melting			$38.00*
No. 2 hvy. melting			38.00*
No. 1 bundles			39.00*
Electric furnace bundles			41.00*
No. 2 bundles			38.00*
No. 1 busheling			39.00*
Machine shop turn.			29.00*
Shoveling turnings			33.00*
Cast iron borings			33.00*
Bar crops and plate			44.00*
Structural and plate, 2 ft.			44.00*
No. 1 RR. hvy. melting			41.00*
Scrap rails, random lgth.			43.00*
Rerolling rails			48.00*
Rails 2 ft and under			47.00*
Angles & splice bars			46.00*
Std. steel axles			53.00*
No. 1 cupola cast	$40.00	to	41.00
Stove plate	36.00	to	37.00
Cast iron carwheels			47.00†
Charging box cast.	39.00	to	40.00
Heavy breakable	36.00	to	37.00
Drop broken machinery	42.00	to	43.00
Unstripped motor blocks	35.00	to	36.00

St. Louis

No. 1 hvy. melting	$37.50	to	$40.00
No. 2 hvy. melting	37.50	to	40.00
No. 2 bundled sheets			35.00
Machine shop turn.			26.00
Shoveling turnings			28.00
Rails, random lengths			45.00*
Rails 3 ft and under			50.00
Locomotive tires, uncut			48.00
Angles and splice bars			48.00*
Std. steel car axles			55.00*
RR. spring steel			48.00*
Cupola cast			40.00
Hvy. breakable cast.			38.00
Cast iron brake shoes			38.00
Stove plate			42.00
Cast iron car wheels	45.00	to	46.00
Malleable			50.00
Unstripped motor blocks			35.00

New York

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$33.00	to	$34.00
No. 2 hvy. melting	31.50	to	32.50
No. 2 bundles	31.50	to	32.50
Machine shop turn.	22.00	to	22.50
Mixed bor. and turn.	24.00	to	24.50
Shoveling turnings	24.00	to	24.50
Clean cast chem. borings	30.00	to	30.50
No. 1 machinery cast	42.00	to	43.00
Mixed yard cast.	33.00	to	35.00
Charging box cast.	36.00	to	38.00
Heavy breakable cast.	33.00	to	35.00
Unstrp. motor blocks	29.00	to	30.00

Boston

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting	$30.00	to	$30.50
No. 2 hvy. melting	30.00	to	30.50
No. 1 bundles	31.00	to	31.50
No. 2 bundles	30.00	to	30.50
No. 1 busheling	30.00	to	30.50
Machine shop turn.			17.00
Mixed bor. and turn.			17.00
Shoveling turnings			19.00
No. 1 busheling	27.00	to	28.00
Clean cast chem. borings			34.00
Mixed cupola cast.	33.00	to	34.00
Heavy breakable cast.			29.00
Stove plate	29.00	to	31.00

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 hvy. melting			$39.30*
No. 2 hvy. melting			35.00
No. 1 bundles, openhearth			40.20*
No. 1 bundles, electric furnace			42.20*
New busheling			40.20*
Machine shop turn.	25.00	to	26.00
Mixed bor. and turn.	31.00	to	32.00
Shoveling turnings	31.00	to	32.00
Cast iron borings	31.00	to	32.00
Low phos. punch'gs, plate			42.70*
No. 1 cupola cast.	46.00	to	47.00
Heavy breakable cast.	40.00	to	42.00
Stove plate			41.00
Automotive cast.			47.00
Cast iron brake shoes			39.00

Cincinnati

No. 1 hvy. melting	$40.50	to	$41.00
No. 2 hvy. melting	39.00	to	41.00
No. 1 bundles	40.50	to	41.00
No. 2 bundles	40.50	to	41.00
Machine shop turn.	28.50	to	29.50
Mixed bor. and turn.	33.50	to	34.50
Shoveling turnings	33.50	to	34.50
Cast iron borings	33.50	to	34.50
Low phos. plate			45.50*
Low phos. 2 ft and under			48.00*
Rails, random lengths			47.00*
Rails, 18 in. and under			53.00*
No. 1 cupola cast.	46.00	to	47.00
Hvy. breakable cast.	39.00	to	40.00
Drop broken cast.	49.00	to	50.00

San Francisco

No. 1 hvy. melting			$34.00*
No. 2 hvy. melting			34.00*
No. 1 bundles			35.00*
No. 2 bundles			29.00
Machine shop turn.			20.00
Elec. fur. 1 ft and under			41.00*
No. 1 RR. hvy. melting			37.00*
Scrap rails random lgth.			39.00*
No. 1 cupola cast.			42.00

Los Angeles

No. 1 hvy. melting			$34.00*
No. 2 hvy. melting			34.00*
No. 1 bundles			35.00*
No. 2 bundles			29.00
Mach. shop turn.			20.00
Elec. fur. 1 ft and under			41.00*
No. 1 RR. hvy. melting			37.00*
Scrap rails, random lgth.			39.00*
No. 1 cupola cast			43.00

Seattle

No. 1 hvy. melting			$34.00*
No. 2 hvy. melting			34.00*
No. 1 bundles			35.00*
No. 2 bundles			29.00
Elec. fur. 1 ft and under			41.00*
No. 1 RR. hvy. melting			37.00*
No. 1 cupola cast.			36.50
Heavy breakable			32.00

Hamilton, Ont.

No. 1 hvy. melting			$35.00
No. 1 bundles			35.00
No. 2 bundles			34.50
Mechanical bundles			33.00
Mixed steel scrap			31.00
Mixed bor. and turn.			32.00
Rails, remelting			35.00
Rails, rerolling			33.00
Bushelings			30.00
Bush., new fact. prep'd.			33.00
Bush., new fact. unprep'd.			32.00
Short steel turnings			32.00
Cast scrap			50.00

SCRAP

for your every requirement

LURIA BROTHERS AND COMPANY, INC.

CONSULT OUR NEAREST OFFICE FOR THE PURCHASE AND SALE OF SCRAP

PLANTS

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PITTSBURGH, PA. Oliver Building
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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Berman

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

Flat-rolled Steel: (cents per pound)	July 15, 1952	July 8, 1952	June 17, 1952	July 17, 1951
Hot-rolled sheets	3.60	3.60	3.60	3.60
Cold-rolled sheets	4.35	4.35	4.35	4.35
Galvanized sheets (10 ga)	4.80	4.80	4.80	4.80
Hot-rolled strip	3.50	3.50	3.50	3.50
Cold-rolled strip	4.75	4.75	4.75	4.75
Plate	3.70	3.70	3.70	3.70
Plates wrought iron	7.85	7.85	7.85	7.85
Stains C-R strip (No. 302)	36.75	36.75	36.75	36.75
Tin and Terneplate: (dollars per base box)				
Tinplate (1.50 lb.) cokes	$8.70	$8.70	$8.70	$8.70
Tinplate, electro (0.50 lb.)	7.40	7.40	7.40	7.40
Special coated mfg. ternes	7.50	7.50	7.50	7.50
Bars and Shapes: (cents per pound)				
Merchant bars	3.70	3.70	3.70	3.70
Cold finished bars	4.55	4.55	4.55	4.55
Alloy bars	4.30	4.30	4.30	4.30
Structural shapes	3.65	3.65	3.65	3.65
Stainless bars (No. 302)	31.50	31.50	31.50	31.50
Wrought iron bars	9.50	9.50	9.50	9.50
Wire (cents per pound)				
Bright wire	4.85	4.85	4.85	4.85
Rails (dollars per 100 lb)				
Heavy rails	$3.60	$3.60	$3.60	$3.60
Light rails	4.00	4.00	4.00	4.00
Semifinished Steel: (dollars per net ton)				
Rerolling billets	$56.00	$56.00	$56.00	$56.00
Slabs, rerolling	56.00	56.00	56.00	56.00
Forging billets	66.00	66.00	66.00	66.00
Alloy blooms, billets, slabs	70.00	70.00	70.00	70.00
Wire Rod and Skelp: (cents per pound)				
Wire rods	4.10	4.10	4.10	4.10
Skelp	3.35	3.35	3.35	3.35

Pig Iron: (per gross ton)	July 15, 1952	July 8, 1952	June 17, 1952	July 17, 1951
Foundry, del'd Phila.	$58.19	$58.19	$58.19	$57.77
Foundry, Valley	52.50	52.50	52.50	52.50
Foundry, Southern, Cin'ti	55.58	55.58	55.58	55.58
Foundry, Birmingham	48.88	48.88	48.88	48.88
Foundry, Chicago†	52.50	52.50	52.50	52.50
Basic, del'd Philadelphia	57.27	57.27	57.27	56.92
Basic, Valley furnace	52.00	52.00	52.00	52.00
Malleable, Chicago†	52.50	52.50	52.50	52.50
Malleable, Valley	52.50	52.50	52.50	52.50
Charcoal, Chicago	70.56	70.56	70.56	70.56
Ferromanganese‡	186.25	186.25	186.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.
‡Average of U. S. prices quoted on Ferroalloy pages.

Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$39.50	$39.50	$43.00*	$44.00*
No. 1 steel, Phila. area	40.50	40.50	41.50*	42.50*
No. 1 steel, Chicago	*38.00*	38.50	41.50*	42.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos. Young'n	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	42.00	42.00	45.50	49.00*
No. 1 cast, Philadelphia	38.50	38.50	38.50	49.00*
No. 1 cast, Chicago	39.50	39.50	42.00	49.00*

*Basing pt., not including broker's fee.
†Shipping pt., not including broker's fee.

Coke: Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electro, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.215	$1.215	$1.215	$1.06
Zinc, East St. Louis	15.00	15.00	16.00	17.50
Lead, St. Louis	15.80	15.80	14.80	16.80
Aluminum, virgin	19.00	19.00	19.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	39.00	39.00	39.00	42.00

Composite Prices

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

	Finished Steel Base Price	Pig Iron	Scrap Steel
July 15, 1952	4.131¢ per lb.	$52.77 per gross ton	*$39.33* per gross ton
One week ago	4.131¢ per lb.	52.77 per gross ton	39.50 per gross ton
One month ago	4.131¢ per lb.	52.77 per gross ton	42.00 per gross ton
One year ago	4.131¢ per lb.	52.69 per gross ton	43.00 per gross ton

	Finished Steel Base Price High	Finished Steel Base Price Low	Pig Iron High	Pig Iron Low	Scrap Steel High	Scrap Steel Low
1952	4.131¢ Jan. 1	4.131¢ Jan. 1	$52.77 May 2	$52.72 Jan. 1	$42.00 Jan. 1	$39.17 July 1
1951	4.131¢ Jan. 2	4.131¢ Jan. 2	52.72 Oct. 9	52.69 Jan. 2	47.75 Jan. 30	42.00 Oct. 2
1950	4.131¢ Dec. 1	3.837¢ Jan. 3	52.69 Dec. 12	45.88 Jan. 3	45.13 Dec. 19	26.25 Jan.
1949	3.837¢ Dec. 27	3.705¢ May 3	46.87 Jan. 18	45.88 Sept. 6	43.00 Jan. 4	19.33 June 2
1948	3.721¢ July 27	3.193¢ Jan. 1	46.91 Oct. 12	39.58 Jan. 6	43.16 July 27	39.75 Mar.
1947	3.193¢ July 29	2.848¢ Jan. 1	37.98 Dec. 30	30.14 Jan. 7	42.58 Oct.. 28	29.50 May 2
1946	2.848¢ Dec. 31	2.464¢ Jan. 1	30.14 Dec. 10	25.37 Jan. 1	31.17 Dec. 24	19.17 Jan.
1945	2.464¢ May 29	2.396¢ Jan. 1	25.37 Oct. 23	23.61 Jan. 2	19.17 Jan. 2	18.92 May 2
1944	2.396¢	2.396¢	$23.61	$23.61	19.17 Jan. 11	15.76 Oct. 2
1943	2.396¢	2.396¢	23.61	23.61	$19.17	$19.17
1942	2.396¢	2.396¢	23.61	23.61	19.17	19.17
1941	2.396¢	2.396¢	$23.61 Mar. 20	$23.45 Jan. 2	$22.00 Jan. 7	$18.92 May 2
1940	2.30467¢ Jan. 2	2.24107¢ Apr. 16	23.45 Dec. 23	22.61 Jan. 2	21.83 Dec. 30	16.04 Apr.
1939	2.35367¢ Jan. 3	2.27207¢ May 16	22.61 Sept. 19	20.61 Sept.12	22.50 Oct. 3	14.08 May 1
1938	2.58414¢ Jan. 4	2.27207¢ Oct. 18	23.25 June 21	19.61 July 6	15.00 Nov. 22	11.00 June
1937	2.58414¢ Mar. 9	2.32263¢ Jan. 4	32.25 Mar. 9	20.25 Feb. 16	21.92 Mar. 30	12.67 June
1936	2.32263¢ Dec. 28	2.05200¢ Mar. 10	19.74 Nov. 24	18.73 Aug. 11	17.75 Dec. 21	12.67 June
1929	2.31773¢ May 28	2.26498¢ Oct. 29	18.71 May 14	18.21 Dec. 17	17.58 Jan. 29	14.08 Dec.

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

YOU MAY save 3.15 POUNDS PER SHEET*

WITH

MicroRold®

STAINLESS STEEL

When you order sheet by gauge number the permissible A. I. S. I. variation in thickness is plus or minus 10%. Thusly, if you order 18 gauge, you may receive a sheet .052 thick when .0475 would suit your purpose. Using a standard 18 gauge 36″ x 120″ sheet as an example, the theoretical weight is 63 pounds, but this weight could permissibly vary between 65.52 pounds and 59.22 pounds.

A sheet of MicroRold .0475 thick with a tolerance of only 3% would weigh 59.85 pounds thus insuring a saving of 3.15 pounds from the theoretical average-weight, or 5.67 pounds from the maximum, while still remaining within the 18 gauge ordering range.

Weight of One Sheet of 18 Gauge 36″ x 120″ Plus or Minus 10%		
	.052″—65.52 Pounds .051″—64.26 Pounds .050″—63.00 Pounds .049″—61.74 Pounds .048″—60.48 Pounds .047″—59.22 Pounds	Theoretical Wt. 63.00 Pounds

Weight of the same size sheet of .0475 plus or minus 3% is 59.85 pounds with an average saving of 3.15 pounds per sheet.

Multiply this saving by the number of sheets you use per month and the price per pound and you have a good dollar and cents reason for buying MicroRold.

** Each additional 1/1000″ of thickness adds 1.26 pounds weight per sheet.*

WASHINGTON STEEL CORPORATION

WASHINGTON, PENNSYLVANIA

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Steel Sheet	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$70.00 *B3*			3.70 *B3*	5.50 *B3*				
	Buffalo, N. Y.			$56.00 *B3*	$66.00 *B3, R3*	$70.00 *B3, R3*		4.45 *B3*	3.70 *B3*	5.50 *B3*	3.50 *B3, R3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$73.00 *A2*	$77.00 *A2*					3.90 *A2*		5.55 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$56.00 *B3*	$66.00 *B3*	$70.00 *B3*			3.70 *B3*	5.50 *B3*	3.50 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.15 *A5* 5.85 *D1*		
	Phoenixville, Pa.								5.90 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.50 *B3*	4.65 *B3*	4.95 *B3*	6.40 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.00 *R4*		
MIDDLE WEST	Alton, Ill.										3.95 *L1*			
	Ashland, Ky.										3.50 *A7*			
	Canton-Massillon				$66.00 *R3*	$70.00 *R3* $66.00 *T5*								
	Chicago, Ill.			$56.00 *U1*	$66.00 *U1, R3,W8*	$70.00 *U1, R3,W8*		4.45 *U1*	3.65 *U1, W8*	5.50 *U1*	3.50 *A1, W8*	4.90 *A1, I3*		
	Cleveland, Ohio				$66.00 *R3*							4.65 *A5,J3*		6.55 *A5* 6.70 *J3*
	Detroit, Mich.		$54.00 *R5*		$69.00 *R5*	$73.00 *R5*					4.40 *M2* 3.80 *G3*	4.85 *G3* 5.45 *M2* 5.00 *R5,D1*	5.95 *G3*	
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana			$56.00 *U1*	$66.00 *U1*	$70.00 *U1, Y1*		4.45 *I3*	3.65 *U1, I3*	5.50 *U1, I3* 6.00 *Y1*	3.50 *U1, Y1,I3*	4.90 *I3*	5.30 *U1, I3* 5.90 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											4.65 *A7*		
	Niles, Ohio Sharon, Pa.										4.00 *S1*	5.35 *S1*	5.40 *S1*	6.55 *S1*
	Pittsburgh, Pa.	$52.00 *U1*	$54.00 *U1, C11*	$56.00 *U1*	$66.00 *U1*	$70.00 *U1, C11*	3.35 *U1* 3.45 *J3*	4.45 *U1*	3.65 *U1, J3*	5.50 *U1, J3*	4.00 *S9,S7* 3.75 *A3* 3.50 *J3,A7*	4.85 *J3,A7* 5.00 *A3* 5.35 *B4,S7*		
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.								3.90 *W3*		3.60 *W3*	4.65 *W3,F3*	5.75 *W3*	7.20 *W3*
	Youngstown, Ohio					$70.00 *Y1, C10*	3.35 *U1, R3*			6.00 *Y1*	3.50 *U1, R3, Y1*	4.65 *R3, Y1* 5.25 *C5,T4* 5.35 *B4*	5.30 *U1, R3* 5.80 *Y1*	6.55 *R3* 7.06 *Y1*
WEST	Fontana, Cal.	$79.00 *K1*	$80.00 *K1*	$75.00 *K1*	$85.00 *K1*	$89.00 *K1*			4.25 *K1*	6.10 *K1*	4.75 *K1*	6.30 *K1*	6.30 *K1*	6.95 *K1*
	Geneva, Utah				$66.00 *C7*				3.65 *C7*	5.50 *C7*				
	Kansas City, Mo.								4.25 *S2*		4.10 *S2*			
	Los Angeles, Calif.				$85.00 *B2*	$90.00 *B2*			4.25 *B2, C7*	6.05 *B2*	4.25 *B2,C7*	6.40 *C1*	6.05 *B2*	
	Minnequa, Colo.								4.10 *C6*		4.55 *C6*			
	San Francisco, Cal. Niles, Cal.				$85.00 *B2*				4.20 *B2* 4.56 *P9*	6.00 *B2*	4.25 *C7,B2*		6.05 *B2*	
	Seattle, Wash.	$73.00 *S11*			$85.00 *B2*				4.30 *B2*	6.10 *B2*	4.50 *B2*		6.30 *B2*	
SOUTH	Atlanta, Ga.										4.05 *A8*			
	Birmingham, Ala. Alabama City, Ala.			$56.00 *T2*	$66.00 *T2*				3.65 *R3,T2*	5.50 *T2*	3.50 *R3,T2*		5.30 *T2*	
	Houston, Texas		$62.00 *S2*		$74.00 *S2*	$78.00 *S2*			4.05 *S2*		3.90 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
[illegible]-rolled 10 ga. & hvyr.	Cold-rolled	Galvanized 10 ga.	Enameling 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled 19 ga.		Coke* 1.25-lb. base box	Electro* 0.25-lb. base box	Hollowware Enameling 29 ga.	
													Bethlehem, Pa.
[illegible] *B5*	4.35 *B5*				5.40 *B5*	6.55 *B5*			4.10 *W6*				Buffalo, N. Y.
										† Special coated mfg ternes deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb, deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb, add 25¢. ELECTRO: 0.50-lb, add 25¢; 0.75-lb, add 65¢.			Claymont, Del.
													Coatesville, Pa.
[illegible] *A2*					5.65 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.10 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
[illegible] *B3*	4.35 *B3*	4.80 *B3*			5.40 *B3*	6.55 *B3*	6.75 *B3*		4.20 *B3*	$8.55 *B3*	$7.25 *B3*		Sparrows Pt., Md.
									4.40 *A5*				Worcester, Mass
									4.20 *R4*				Trenton, N. J.
									4.40 *L1*				Alton, Ill.
[illegible] *A7*		4.80 *A7*	4.65 *A7*										Ashland, Ky.
		4.80 *R3*											Canton-Massillon
[illegible] *W8*					5.40 *U1*				4.10 *A5,R3, N4*				Chicago, Ill.
[illegible] *R3,J3*	4.35 *R3,J3*		4.65 *R3*		5.40 *R3,J3*	6.55 *R3,J3*			4.10 *A5*				Cleveland, Ohio
[illegible] *G3* [illegible] *M3*	4.55 *G3*				5.95 *G3*	7.10 *G3*							Detroit, Mich.
													Duluth, Minn.
[illegible] *U1, Y1,I3*	4.35 *U1, Y1,I3*	4.80 *U1,I3*	4.65 *U1,I3*	5.20 *U1*	5.40 *U1,I3* 5.90 *Y1*	6.55 *U1,I3* 7.05 *Y1*		5.40 *I3*	4.10 *Y1*	$8.45 *I3, U1, Y1*	$7.15 *U1,I3*	5.85 *U1* 5.30 *Y1*	Gary, Ind. Harbor, Indiana
[illegible] *G2*	5.05 *G2*	5.50 *G2*	5.35 *G2*								$7.35 *G2*	6.05 *G2*	Granite City, Ill.
		5.20 *C9*											Kokomo, Ind.
	4.35 *A7*		4.65 *A7*	5.20 *A7*									Middletown, Ohio
[illegible] *N3* [illegible] *S1*		6.00 *N3*		6.00 *N3*	5.40 *S1*								Niles, Ohio Sharon, Pa.
[illegible] *U1, J3,A7* [illegible] *A3*	4.35 *U1, J3,A7*	4.80 *U1*	4.65 *U1*		5.40 *U1,J3*	6.55 *U1,J3*	7.20 *U1*		4.10 *A5* 4.41 *P6*	$8.45 *U1,J3*	$7.15 *U1,J3*	5.85 *U1*	Pittsburgh, Pa.
									4.30 *P7*				Portsmouth, Ohio
[illegible] *W3,W5*	5.35 *F3* 4.35 *W3,W5*	4.80 *W3,W5*		5.20 *W3,W5*	5.75 *W3*	6.90 *W3*				$8.45 *W3,W5*	$7.15 *W3,W5*	6.15 *W5* 5.85 *F3*	Weirton, Wheeling, Follansbee, W. Va.
[illegible] *U1, Y1*	4.35 *R3, Y1*	5.50 *R1*	4.65 *Y1*	6.05 *E2*	5.40 *U1,R3* 5.90 *Y1*	6.55 *R3* 7.05 *Y1*		6.05 *R1,E2*	4.10 *Y1*	$8.45 *R3*	$7.15 *R3*		Youngstown, Ohio
[illegible] *K1*	5.30 *K1*				6.35 *K1*	7.50 *K1*			4.90 *K1*				Fontana, Cal.
[illegible] *C7*													Geneva, Utah
													Kansas City, Mo.
[illegible] *C7*		5.55 *C7*						5.40 *C7*	4.90 *B2,C7*	$9.20 *C7*	$7.90 *C7*		Los Angeles, Cal.
									4.35 *C6*				Minnequa, Colo.
[illegible] *C7*	5.30 *C7*	5.55 *C7*											San Francisco, Cal. Niles, Cal.
													Seattle, Wash.
													Atlanta, Ga.
[illegible] *R3,T2*	4.35 *T2*	4.80 *R3,T2*			5.40 *T2*			4.75 *R3*	4.10 *R3,T2*	$8.55 *T2*	$7.25 *T2*		Birmingham, Ala. Alabama City, Ala.
									4.50 *S2*				Houston, Texas

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg'r. Bright
EAST	Bethlehem, Pa.				4.30 *B3*	5.40 *B3*	5.55 *B3*					
	Buffalo, N. Y.	3.70 *B3,R3*	3.70 *B3,R3*	4.60 *B5*	4.30 *B3,R3*	5.40 *B3*	5.55 *B3*	3.70 *B3*				4.85 *W6*
	Claymont, Del.							4.15 *C4*		4.85 *C4*		
	Coatesville, Pa.							4.15 *L4*		5.25 *L4*		
	Conshohocken, Pa.							4.15 *A2*	4.75 *A2*	5.05 *A2*	5.90 *A2*	
	Harrisburg, Pa.							6.30 *C3*	6.30 *C3*			
	Hartford, Conn.			5.10 *R3*		5.85 *R3*						
	Johnstown, Pa.	3.70 *B3*	3.70 *B3*		4.30 *B3*		5.55 *B3*	3.70 *B3*		4.75 *B3*	5.65 *B3*	4.85 *B3*
	Newark, N. J.			5.00 *W10*		5.75 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.10 *W10*								
	Sparrows Point, Md.		3.70 *B3*					3.70 *B3*		4.75 *B3*	5.65 *B3*	4.95 *B3*
	Worcester, Mass.					5.75 *A5*						5.15 *A5,W4*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.15 *L1*										5.65 *L1*
	Ashland, Ky.							3.70 *A7*				
	Canton-Massillon	3.70 *R3*		4.55 *R3,R2*	3.95 *T5* 4.30 *R3*	4.90 *T5* 5.40 *R3,R2*						
	Chicago, Ill.	3.70 *U1, R3, W8*	3.70 *R3*	4.55 *A5,B5, W8,W1*	4.30 *U1,R3 W8*	5.40 *R3,W8 W10,B5,L2* 5.45 *A5*		3.70 *U1,W8*	4.75 *U1*	4.75 *U1*	5.65 *U1*	5.10 *W7* 4.85 *R3,A5, K2,N4*
	Cleveland, Ohio	3.70 *R3*	3.70 *R3*	4.55 *A5,C13*		5.45 *A5*	5.55 *R3,J3*	3.70 *R3,J3*	4.75 *J3*		5.65 *R3,J3*	4.85 *A5,C13*
	Detroit, Mich.	3.85 *R5*		4.70 *P8,R5* 4.80 *P3*	4.45 *R5* 4.65 *G3*	5.50 *R5* 5.55 *P8* 5.60 *P3*						
	Duluth, Minn.											4.85 *A5*
	Gary Ind. Harbor Indiana	3.70 *U1, Y1, I3*	3.70 *U1,I3, Y1*	4.55 *R3,M5, L2*	4.30 *U1,I3, Y1*	5.40 *R3,M5, L2*	5.55 *U1,I3* 6.05 *Y1*	3.70 *U1,I3, Y1*	4.75 *I3*	4.75 *U1*	5.65 *U1,I3* 6.15 *Y1*	5.10 *M4*
	Granite City, Ill.							4.40 *G2*				
	Kokomo, Ind.											4.95 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							3.95 *S1*		5.20 *S1*	5.70 *S1*	
	Pittsburgh, Pa.	3.70 *U1,J3*	3.70 *U1,J3*	4.55 *R3,A5, J3,S8,W10, C8*	4.30 *U1,C11*	5.40 *C11,S8, W10,C8,A5*	5.55 *U1,J3*	3.70 *U1,J3*	4.75 *U1*	4.75 *U1*	5.65 *U1,J3*	4.85 *A5,J3* 5.25 *P6*
	Portsmouth, Ohio											5.25 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	3.85 *W3*						4.00 *W3,W5*				
	Youngstown, Ohio	3.70 *U1,R3, Y1*	3.70 *U1,R3, Y1*	4.55 *Y1,F2*	4.30 *U1, Y1, C10*	5.40 *Y1,C10, F2*	5.55 *U1* 6.05 *Y1*	3.70 *U1,R3, Y1*			5.65 *R3* 6.15 *Y1*	4.85 *Y1*
WEST	Fontana, Cal.	4.40 *K1*	4.40 *K1*		5.35 *K1*		6.60 *K1*	4.30 *K1*		5.70 *K1*	6.25 *K1*	
	Geneva, Utah							3.70 *C7*			5.65 *C7*	
	Kansas City, Mo.	4.30 *S2*	4.30 *S2*		4.90 *S2*							5.45 *S2*
	Los Angeles, Cal.	4.40 *C7,B2*	4.40 *C7,B2*		5.35 *B2*		6.25 *B2*					5.50 *C7,B2*
	Minnequa, Colo.	4.15 *C6*	4.50 *C6*					4.50 *C6*				5.10 *C6*
	San Francisco, Cal. Niles, Cal.	4.45 *B2* 4.40 *C7* 4.65 *P9*	4.45 *B2* 4.40 *C7* 4.65 *P9*				6.30 *B2*					5.90 *C7*
	Seattle, Wash.	4.45 *B2*	4.45 *B2*				6.30 *B2*	4.60 *B2*			6.55 *B2*	
SOUTH	Atlanta, Ga.	4.25 *A8*	4.25 *A8*									5.10 *A8*
	Birmingham, Ala. Alabama City, Ala.	3.70 *R3,T2*	3.70 *R3,T2*				5.55 *T2*	3.70 *R3,T2*			5.65 *T2*	4.85 *R3,T2*
	Houston, Tex.	4.10 *S2*	4.10 *S2*		4.70 *S2*			4.10 *S2*				5.25 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 California Cold Rolled Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Steel Corp., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Steel & Carbide Corp., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Corp., Oakland, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLauth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal, Iron & R. R. Co., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Steel Co., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Co., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

Steel Prices

Base price, f.o.b., dollars per 100 lb.

WAREHOUSES		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars			
Cities	Delivery Charge*	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As Rolled	Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.54-6.44	6.34-7.05	8.07	6.07	.....	6.17	6.17	6.05	6.67	.....	.....	.....	.....
Birmingham	.15	5.59	6.37	7.20-7.35[1]	5.54	.....	5.85	5.70	5.52	7.60	.....	.....	.....	.....
Boston	.20	6.25	7.03	8.24-8.33	6.20	7.74-8.70	6.38-6.63	6.25	6.10-6.14	6.61-6.92	10.25-10.30	10.55-10.63	11.95	12.15-12.28
Buffalo	.20	5.50-5.54	6.28-6.32	8.11-8.20	5.86	.....	5.89-5.98	5.80-5.82	5.52-5.55	6.18-6.45	10.15	10.45-10.52	11.80	12.10-12.17
Chicago	.20	5.54	6.32	7.70	5.49	.....	5.65-5.70	5.65	5.47	6.05-6.30	.....	10.10	.....	11.75
Cincinnati	.15	5.87	6.39	8.17	5.79	.....	6.17	6.12	5.77	6.66	.....	10.52	.....	12.22
Cleveland	.20	5.52-5.54	6.32	7.81-7.96	5.65-5.88	.....	5.82-5.83	5.95-6.16	5.54-5.61	6.15-6.40	.....	10.21	.....	11.86
Detroit	.20	5.73-5.74	6.49	8.10-8.34	5.78	.....	6.04-6.17	6.12	5.76	6.60	.....	10.37	.....	12.12
Houston	.20	6.35-6.58	7.37-8.09	8.57	6.15	.....	6.39-6.42	6.32-6.35	6.38	8.38-8.63	10.95	11.12-11.25	11.40	12.62-12.90
Indianapolis	del'd.	5.94	6.72	8.25	5.89	.....	6.10	6.05	5.87	6.80	.....	10.50	.....	.....
Kansas City	.20	6.22-6.40	7.64-7.68	8.66-8.70	6.10-6.90	7.81	6.38-6.74	6.43-6.48	6.20-6.77	7.01-7.22	10.00	10.10	11.50	11.80
Los Angeles	.20	6.30	8.10-8.45	9.30-9.35	6.40	10.45	6.30	6.30	6.25-6.35	8.15	11.30	11.30	13.05	13.50
Memphis	.10	6.25	7.03	7.51	6.20	.....	6.36	6.36-6.61	6.33-6.57	7.11	.....	.....	.....	.....
Milwaukee	.20	5.71	6.48	7.86-7.87	5.66	.....	5.81-5.87	5.82	5.64	6.31-6.61	.....	10.17	.....	.....
New Orleans	.15	5.98	7.01	8.26	5.93	.....	6.09	6.09	5.91	7.02	.....	.....	.....	.....
New York	.30	6.09-6.52	6.90-7.08	8.12-8.33	6.36-7.19	7.67	6.47-6.88	6.39-6.40	6.22-6.42	7.03-7.58	10.45	10.49-10.75	12.10	12.14-12.40
Norfolk	.20	6.68	.....	.....	6.33	.....	6.20	6.20	5.95	7.30	.....	.....	.....	.....
Philadelphia	.25	5.84-6.07	6.80-7.22	8.00-8.38	6.04-6.68	7.15	6.05-6.19	5.86-6.09	6.14-6.27	6.96-7.16	9.82-10.17	10.24-10.47	11.82	11.89-12.12
Pittsburgh	.20	5.54	6.32	7.70-8.10	5.59-5.84	.....	5.65-5.70	5.65	5.47	6.15-6.40	.....	10.10	.....	11.75
Portland	.20	7.25	8.64-9.00	9.10-9.25	7.30	.....	6.80	7.88	7.00	8.65	.....	.....	.....	.....
Salt Lake City	.20	7.95	.....	9.80-10.35	8.00	.....	7.45	7.60	7.95	.....	.....	.....	.....	.....
San Francisco	.15	6.51-6.65	7.88-8.23	9.10	6.42	10.45	6.40-6.43	6.30	6.32-6.34	8.15-8.20	11.30	11.30	13.05	13.50
Seattle	.20	6.14-6.81	8.38-8.44	8.93	7.05-7.75	.....	6.71-6.90	6.32-6.57	6.50-6.80	8.89-8.93	.....	.....	.....	.....
St. Louis	.20	5.84	6.62-7.15	8.00	5.79	7.66-8.15	6.05-6.10	6.05-6.22	5.77-5.80	6.45-6.70	10.08	10.40	11.73	12.05
St. Paul	.15	6.14	6.92	8.45	6.09	.....	6.25	6.25	6.07	6.75	.....	.....	.....	.....

* Metropolitan area delivery.

BASE QUANTITIES (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

EXCEPTIONS: (1) 500 to 1499 lb.

STAINLESS STEELS

Base price, cents per lb, f.o.b. mill.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets*: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*; (type 316 add 4.5¢) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; (type 316 add 4.5¢); W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7*; Wallingford, Conn., *W1*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *J4*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3* (type 416 add ¼¢); Butler, Pa., *A7*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts, f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	34.0	12.0	37.0	16.0	39.0	19.5	40.0	20.0	40.5	21.0	41.0	21.5	41.5	22.0						
Youngstown *R3*	36.0	14.0	39.0	18.0	41.5	21.5	42.9	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Oakland *K1*	25.0	3.0	28.0	7.0	30.5	10.5	31.0	11.0	31.5	12.0	32.0	12.5	32.5	13.0						
Pittsburgh *J3*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.5	8.0	32.5	11.5	34.5	13.5
Pittsburgh *N2*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Alton, Ill. *L1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Sharon *M3*	36.0	13.0	39.0	17.0	41.5	20.0	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.0						
Pittsburgh *N1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5		32.5		34.5	
Wheeling *W5*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0						
Wheatland *W4*	36.0	14.0	39.0	17.0	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown *Y1*	36.0	14.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
Indiana Harbor *Y1*	35.0	13.0	38.0	17.0	40.5	20.5	41.0	21.0	41.5	22.0	42.0	22.5	42.5	23.0						
Lorain, *N2*	36.0	19.0	39.0	18.0	41.5	21.5	42.0	22.0	42.5	23.0	43.0	23.5	43.5	24.0	29.5	9.5	32.5	12.5	34.5	14.5
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	33.5	13.0	37.5	17.0	39.5	20.5	40.0	21.0	40.5	22.0	41.0	22.5	41.5	23.0						
Youngstwon *R3*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Oakland *K1*	24.5	4.0	28.5	8.0	30.5	11.5	31.0	12.0	31.5	13.0	32.0	13.5	32.5	14.0						
Pittsburgh *J3*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5	29.0	7.5	33.0	12.0	36.5	15.5
Pittsburgh *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5
Alton, Ill. *L1*	32.5	12.0	36.5	16.0	38.5	19.5	39.0	20.0	39.5	21.0	40.0	21.5	40.5	22.0						
Sharon *M3*	35.5	14.0	39.5	18.0	41.5	21.0	42.0	21.5	42.5	22.0	43.0	22.5	43.5	23.0						
Pittsburgh *N1*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0		33.0		36.5	
Wheeling *W5*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0						
Wheatland *W4*	35.5	13.5	39.5	17.5	41.5	19.5	42.0	20.5	42.5	21.0	43.0	21.5	43.5	22.5						
Youngstown *Y1*	35.5	15.0	39.5	19.0	41.0	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	26.0	29.0	10.0	33.0	14.0	36.5	17.5
Indiana Harbor *Y1*	34.5	14.0	38.5	18.0	40.5	21.0	41.0	22.0	41.5	23.0	42.0	23.5	42.5	24.0						
Lorain, *N2*	35.5	15.0	39.5	19.0	41.5	22.5	42.0	23.0	42.5	24.0	43.0	24.5	43.5	25.0	29.0	10.0	33.0	14.0	36.5	17.5

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢.

Threads only, buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 15.0¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.53
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	25.40
Birmingham, del'd	21.69
Neville Island	23.00

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Meter	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*		7.25	8.50	9.30	9.85	10.40	11.10
Brackenridge *A3*		7.25	8.50	9.30	9.85		
Granite City *G2*		7.95	9.20				
Ind. Harbor *I3*	6.75	7.25					
Mansfield *E2*	7.25	7.75	9.00	9.80			
Niles, O. *N3*	7.05	7.55					
Vandergrift *U1*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Warren, O. *R3*	6.75	7.25	8.50	9.30	9.85	10.40	11.10
Zanesville *A7*	6.75	7.25	8.50	9.30	9.85	10.40	11.10

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery	Low Phos. Charcoal
Bethlehem *B3*	54.00	54.50	55.00	55.50			
Birmingham *R3*	48.38	48.88					
Birmingham *W9*	48.38	48.88					
Birmingham *S5*	48.38	48.88					
Buffalo *R3*	52.00	52.50	53.00				
Buffalo *H1*	52.00	52.50	53.00			63.75	
Chicago *I4*	52.00	52.50	52.50	53.00			
Cleveland *A5*	52.00	52.50	52.50	53.00	57.00		
Cleveland *R3*	52.00	52.50	52.50				
Daingerfield, Tex. *L3*	48.00	48.50	48.50				
Duluth *I4*	52.00	52.50	52.50	53.00			
Erie *I4*	52.00	52.50	52.50	53.00			
Everett, Mass. *M6*		59.75	60.25				
Fontana *K1*	58.00	58.50					
Geneva, Utah *U1, Y1*	52.00	52.50	52.50	53.00			
Granite City, Ill. *K3*	53.90	54.40	54.90				
Hubbard, Ohio *Y1*	52.00	52.50	52.50				
Ironton, Utah *C7*	52.00	52.50					
Jackson, Ohio *J1,G1*						62.50	
Lyle, Tenn. *T3*							66.00
Monessen *P6*	54.00						
Neville Island *P4*	52.00	52.50	52.50	53.00			
Pittsburgh *U1*	52.00			53.00			
Sharpsville *S3*	52.00	52.50	52.50	53.00			
Steelton *B3*	54.00	54.50	55.00	55.50	60.00		
Swedeland *A2*	56.00	56.50	57.00	57.50			
Toledo *I4*	52.00	52.50	52.50	53.00			
Troy, N. Y. *R3*	54.00	54.50	55.00		60.00		
Youngstown *Y1*	52.00	52.50	52.50	53.00			
N. Tonawanda, N. Y. *T1*		52.50	53.00				

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per net ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	22.67	26.66	21.99	25.86
	2½	12	30.48	35.84	29.57	34.76
	3	12	33.90	39.90	32.89	38.70
	3½	11	42.37	49.80	41.10	48.39
	4	10	52.60	61.88	51.03	60.02
National Tube	2	13	21.62	26.48		
	2½	12	29.65	36.32		
	3	12	34.00	41.64		
	3½	11	40.34	49.41		
	4	10	51.21	62.72		
Pittsburgh Steel	2	13		27.08		
	2½	12	30.49	37.15		
	3	12	34.95	42.50		
	3½	11	41.48	50.54		
	4	10	52.65	64.16		

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $108.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipment less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn. *S7*	5.35	6.80	7.40	9.35	11.65
Carnegie, Pa. *S9*		6.80	7.40	9.35	11.65
Cleveland *A5*	4.65	6.45	7.40	9.35	11.65
Detroit *D1*	5.60	6.65	7.25		
New Castle, Pa. *B4*	5.35	6.80	7.40	9.35	
New Haven, Conn. *D1*	5.85	6.75	7.35		
Sharon, Pa. *S1*	5.35	6.80	7.40	9.35	11.65
Weirton, W. Va. *W3*	5.35	6.80	7.40	9.35	11.65
Worcester, Mass. *A5*	4.95	6.75	7.70	9.65	11.95
Youngstown *C5*		6.80	7.40	9.35	11.65

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Base Col.	Woven Wire Fence 8-15½ ga. Base Col.	Fence Posts Base Col.	Single Loop Bale Ties Base Col.	Twisted Barbless Wire Base Col.	Galv. Barbed Wire Base Col.	Merch. Wire Annld Galv. Wire* ¢/lb.	Merch. Wire Galv. Cult. ¢/lb.
Alabama City *R3*	118	126	....	123	....	136	5.70	5.95
Aliquippa, Pa. *J3*	118	132	....	....	136	140	5.70	6.15
Atlanta *A8*	121	133	....	126	126	143	5.95	6.40
Bartonville *K2*	118	130	....	123	143	143	5.70	6.15
Buffalo *W6*							6.85	
Cleveland *A6*	125	....	....	....	....	....	5.70	6.10
Cleveland *A5*							5.70	6.10
Crawfrdsvl. *M4*		132	....	....	....	145	5.95	6.40
Donora, Pa. *A5*	118	130	....	123	140	140	5.70	6.15
Duluth *A5*	118	130	....	123	140	140	5.70	6.15
Fairfield, Ala. *T2*	118	130	....	123	....	140	5.70	6.15
Houston *S2*	126	138	....	....	....	148	6.10	6.55
Johnstn., Pa. *B3*	118	130	....	....	140	....	5.70	6.15
Joliet, Ill. *A5*	118	130	....	123	....	140	5.70	6.15
Kokomo, Ind. *C9*	120	132	....	125	138	142	5.80	6.05
Los Angeles *B2*							6.65	
Kansas City *S2*	130	....	....	135	....	152	6.30	6.75
Minnequa *C6*	123	138	130	128	146	146	5.95	6.45
Monessen *P6*	124	135	....	....	....	145	5.95	6.40
Moline, Ill. *R3*	....	....	136	....	....	....	....	....
Pittsburg, Cal. *C7*	137	....	....	147	156	160	6.65	6.80
Portsmouth *P7*	124	137	....	....	147	147	6.10	6.40
Rankin, Pa. *A5*	118	130	....	....	140	140	5.70	6.15
So. Chicago *R3*	118	126	140	123	....	136	5.70	5.95
S. San Fran. *C6*		....	....	147	....	160	6.65	7.10
Sparrows Pt. *B3*	120	....	....	125	142	142	5.80	6.25
Sterling, Ill. *N4*	118	130	....	123	140	140	5.70	6.15
Struthers, O. *Y1*	....	....	....	....	....	....	5.70	6.15
Torrance, Cal. *C7*	138	....	....	....	....	....	6.65	....
Worcester *A5*	124	....	....	....	....	....	6.00	6.45
Williamsport, Pa. *S10*	....	....	150	....	....	....	....	....

Cut Nails carloads, base $7.35 per 100 lb. (less 20¢ to jobbers), at Conshohocken, Pa., (*A2*), Wheeling, W. Va. (*W5*), $7.15.

* Alabama City and So. Chicago don't include $1.00 extra

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Axles	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.60	4.00	4.70	....	....	....	....	....
Chicago *R3*	....	....	....	6.15	....	....	....	....
Cleveland *R3*	....	....	....	....	....	9.35	....	....
Ensley *T2*	3.60	4.00	....	....	....	....	....	....
Fairfield *T2*	....	4.00	4.70	6.15	5.60	....	4.50	9.80
Gary *U1*	3.60	4.00	....	....	....	....	4.50	....
Ind. Harbor *I3*	3.60	....	4.70	6.15	5.60	....	4.50	....
Johnstown *B3*	....	4.00	....	....	5.60	....	....	....
Joliet *U1*	....	4.00	4.70	....	....	....	....	....
Kansas City *S2*	....	....	....	6.40	....	....	....	9.85
Lackawanna *B3*	3.60	4.00	4.70	....	....	....	4.50	....
Lebanon *B3*	....	....	....	6.15	....	9.35	....	9.85
Minnequa *C6*	3.60	4.50	4.70	6.15	....	....	4.50	9.85
Pittsburgh *R3*	....	....	....	....	....	9.35	....	....
Pittsburgh *O1*	....	....	....	....	....	9.35	....	9.85
Pittsburgh *P5*	....	....	....	....	....	....	....	9.85
Pittsburgh *J3*	....	....	....	6.15	....	....	....	....
Pitts., Cal. *C7*	....	....	....	....	....	....	4.65	....
Seattle *B2*	....	....	....	6.65	....	....	4.65	....
Steelton *B3*	3.60	....	4.70	....	....	....	4.50	....
Struthers *Y1*	....	....	....	6.15	....	....	....	....
Torrance *C7*	....	....	....	....	....	....	4.65	....
Youngstown *R3*	....	....	....	6.15	....	....	....	....

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

*Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
3½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.03
35	65, 110	8.03
30	65, 84, 110	8.03
24	72 to 104	8.03
20	84, 90	8.03
17	60, 72	8.03
14	60, 72	8.03
10, 12	60	8.57
8	60	8.84
6	60	9.10

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more	$43.00
60% or less	40.00

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg. Reg.	K.	Less Keg. Hvy.	K.
⅛ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

⅛ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

⅛ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
⅛ in. & smaller	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thus ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

Pct Off List

Packaged, steel, plain finished	48—10
Packaged, plate finish	31—10
Bulk, plain finish**	62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb

½ in. & larger $7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
⅜ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
⅝ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	23	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

REFRACTORIES

Fire Clay Brick

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5)	$94.60
No. 1 Ohio	88.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	88.00
No. 2 Ohio	79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$94.60
Childs, Pa.	99.00
Hays, Pa.	100.10
Chicago District	104.50
Western Utah and Calif.	111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago	111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	16.50
Silica cement, net ton, bulk, Hays, Pa.	18.70
Silica cement, net ton, bulk, Ensley, Ala.	17.60
Silica cement, net ton, bulk, Chicago District	17.60
Silica cement, net ton, bulk, Utah and Calif.	24.70

Chrome Brick

Per Net Ton

Standard chemically bonded Balt, Chester	$82.00

Magnesite Brick

Standard, Baltimore	$104.00
Chemically bonded, Baltimore	93.00

Grain Magnesite

St. ⅝-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed	$62.70
Domestic, f.o.b. Chewalah, Wash., in bulk	36.30
in sacks	41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio, per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢	$13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. 1952 prices not yet established. 1951 prices were:

Old range, bessemer	$8.70
Old range, nonbessemer	8.55
Mesabi, bessemer	8.45
Mesabi, nonbessemer	8.30
High phosphorus	8.30

After adjustments for analyses, prices will be increased or decreased as the case may be for increases or decreases after Dec. 2, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags	7.4¢ to 9.0¢
Canadian sponge iron, del'd, in East	10.00¢
Domestic sponge iron, 98+% Fe, carload lots	15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe	42.5¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	52.5¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.5+% Fe	82.0¢ to $1.43
Aluminum	21.5¢
Brass, 10 ton lots	$0.00¢ to 32.25¢
Copper, electrolytic	10.75¢ plus metal value
Copper, reduced	10.00¢ plus metal value
Cadmium, 100-199 lb	95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd	$3.50
Lead	7.5¢ to 12.0¢ plus metal value
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	88.0¢
Nickel, annealed	95.0¢
Nickel, spherical, unannealed	92.0¢
Silicon	28.5¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	82.00¢
Stainless steel, 316	$1.10
Tin	14.00¢ plus metal value
Tungsten, 99% (-65 mesh)	$6.00
Zinc, 10 ton lots	23.0¢ to 30.5¢

reducing troubles?

Torrington Swaging Machines offer a means of reducing rod, wire and tubing that improves the quality of the material, gives a better surface, without waste of stock. Hammer blows (4000 a minute) speed production, and give the metal toughness and resiliency that cannot be obtained by any other method.

Write for your free copy of "The Torrington Swaging Machine." This informative booklet gives complete details on the art of swaging and the extensive line of Torrington Swagers.

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Swager Department
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Makers of
TORRINGTON NEEDLE BEARINGS

—Ferroalloy Prices—

Ferrochrome
Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C	30.50	0.20% C	29.50
0.10% C	30.00	0.50% C	29.25
0.15% C	29.75	1.00% C	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome
Contract price, cents per pound, chromium contained, lump size, delivered.
High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome
Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal
Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C.	1.10
9 to 11% C.	1.08

Low Carbon Ferrochrome Silicon
(Cr 34-41%, Si 42-49%, C 0.05% max.)
Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.
Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon
Contract price per lb of alloy, dump delivered.
30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon
Contract prices, cents per lb of alloy lump, delivered.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

CMSZ
Contract price, cents per lb of alloy, delivered.
Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ
Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy
Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4
Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese
78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy W. Va., Ashtabula, O.	$185
F.o.b. Johnstown, Pa.	$187
F.o.b. Sheridan, Pa.	$185
F.o.b. Etna, Clairton, Pa.	$188

$2.00 for each 1% above 82% Mn, penalty, $2.15 for each 1% below 78%.
Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	10.95
Ton lots	12.55

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"Not when we have Torrington make them, Tom. Their production methods and facilities are among the finest in the world."

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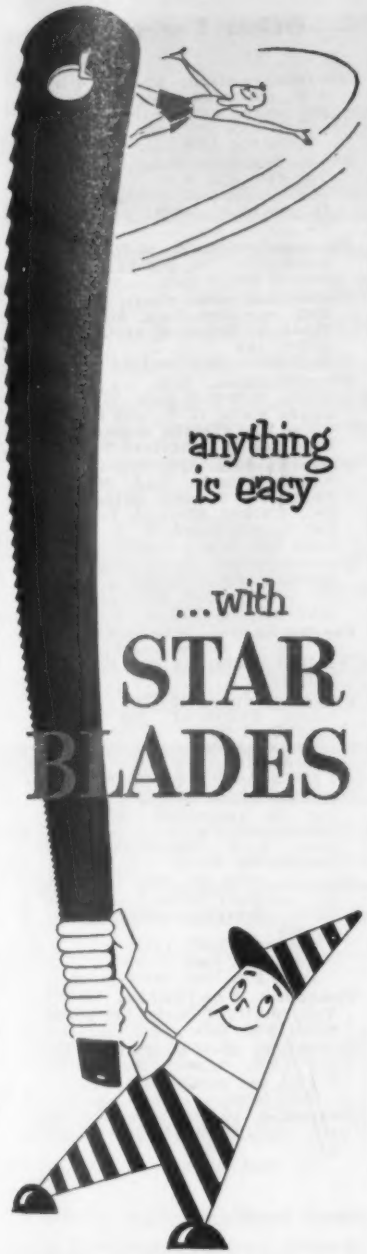

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1083A

Ferroalloys

Continued

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 1% max. Si	19-21% Mn 1% max. Si
Palmerton, Pa.	$74.00	$75.00
Pbh. or Chicago	74.00	75.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	34.75
Ton lots	36.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	28
Ton lots	30
Less ton lots	32

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.7% max. C, 0.06% P, 90% Mn	26.25	28.10	29.30
0.07% max. C	25.75	27.60	28.80
0.15% max. C	25.25	27.10	28.30
0.30% max. C	24.75	26.60	27.80
0.50% max. C	24.25	26.10	27.30
0.75% max. C 7.00% max. Si	21.25	23.10	24.30

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo — $1.15

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn — 19.15¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max. C, deduct 0.2¢.

Carload bulk	9.90
Ton lots	11.55
Briquet, contract basis carlots, bulk delivered, per lb of briquet	11.15
Ton lots	12.75

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $90.00. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	21.70
97% Si, 1% Fe	22.10

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	14.30
50% Si	12.40	85% Si	15.55
90.95% Si			17.50

Calcium Metal

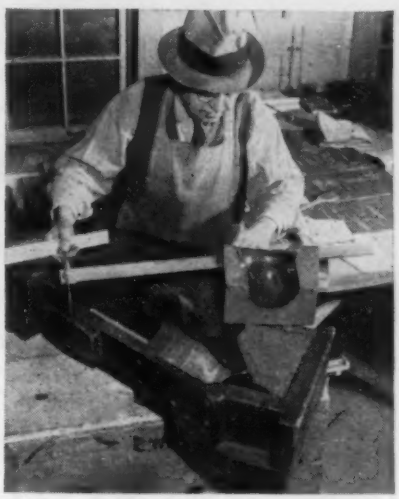
Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

LEBANON CIRCLE L Castings

in Stainless and Special Alloys...

with Controlled High Quality



Lebanon Steel Foundry pattern makers study engineering designs, suggest improvements and plan jobs for production giving careful consideration to feed heads, rigging and gating. This care in preparation can save valuable time and eliminate costly failures. Pattern making, however, is but one of many steps in production rigidly followed by Lebanon craftsmen to provide CIRCLE (L) castings of *controlled* high quality.

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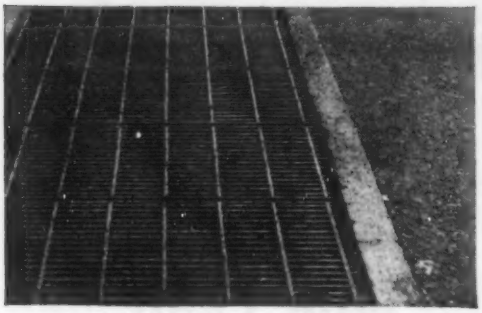

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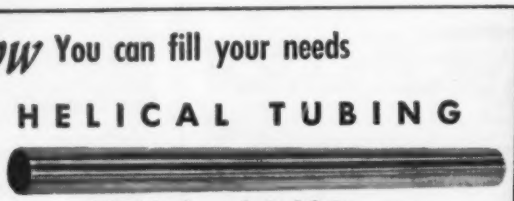

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Other Ferroalloys

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered, per pound contained Cb.
Ton lots $4.90
Less ton lots 4.95

Ferro-Tantalum-Columbium, 30% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40%, regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¼ x down, packed, per pound contained W5, ton lots, delivered $5.00

Ferrovanadium, 35-55% contract basis, delivered, per pound, contained V.
Openhearth ..... $3.00-$3.10
Crucible 3.10- 3.20
High speed steel (Primos) 3.20- 3.25

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
Carload, bulk lump ..... 14.50¢
Ton lots, bulk lump ..... 15.75¢
Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ..... $1.28

Zirconium, 35-40%, contract basis f.o.b. plant, freight allowed, per pound of alloy.
Ton lots ..... $1.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk ..... 7.00¢

Boron Agents

Boronil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls
Ton lots, per pound ..... 45¢
Less ton lots, per pound.... 50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2%, C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.20
F.o.b. Wash., Pa.; 100 lb up
10 to 14% B ..... .95
14 to 19% B 1.30
19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.
No. 1 ..... $1.00
No. 6 ..... 65¢
No. 79 ..... 60¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
Ton lots $1.46
Less ton lots 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered.
Less ton lots $1.80

Silcaz, contract basis, delivered.
Ton lots ..... 45.00¢

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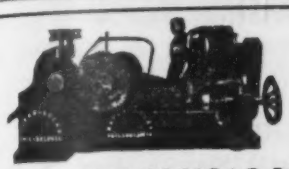

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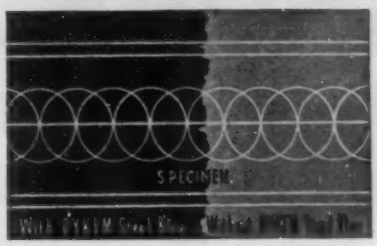

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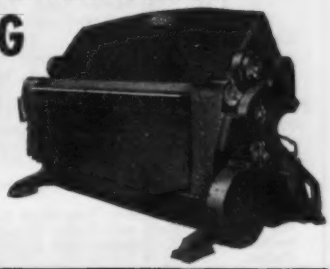

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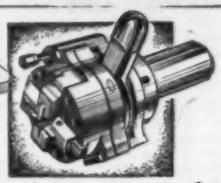

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Hill Clutch & Machine & Fdy. Co. Open Side Abrasive Belt Grinding Unit, Designed to accommodate slabs up to ⅜" thick x 30" wide x 30' long.

BRAKE—LEAF TYPE
16' x ¾" Dreis & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

BUILDING
72'6" x 140' Steel Building—NEW—Designed for Corrugated Steel Siding and to carry load of 30 ton overhead electric traveling crane.

BULLDOZER
#9 William White Bulldozer, Motor Driven with 50 H.P. Motor. 440 v. 3 ph. 60 cycle. Face of Crosshead 20" x 90". Movement of Crosshead 24".

CHARGING MACHINE
3½ Ton Wellman-Seaver-Morgan Revolving Charging Machine—Floor Type.

CRANES
5 ton Niles Crane 56' 3⅜" Span. Three motors, 440 volt, 3 phase, 60 cycle.
25 ton P&H Crane 80' Span, With 5 ton Auxiliary Four Motors 440 volt 3 phase 60 cycle. Built 1942-43 for outdoor service.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment.

FURNACE—BILLET HEATING
Surface Combustion Super Fast Heating Furnace Tangential Burner, 3 Section, Pusher Capacity 3600 lb. per hr. gross, Max. Temp. 2750° F. Complete Elecl. Equip.

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.
25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

PLANERS
48" x 48" x 20' Cincinnati, Four Head
48" x 48" x 12' Niles-Bement-Pond, Four Head
60" x 60" x 12' Niles-Bement-Pond, Four Head
72" x 72" x 12' Niles-Bement-Pond, Four Head

PLATING MACHINE
Type "B" Crown Full Automatic Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

PRESS—KNUCKLE JOINT
1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" stroke, 18" Shut Height.

ROLLING MILLS
8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.
12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P Motor 440/3/60. Starter and Controls, Incl. Coiler.
12¼" x 20" Waterbury Farrel Single Stand Two High. Complete with Gear Reducer and 50 H.P. A.C. Motor.
18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill, Complete with Elec. Equip.

TESTING MACHINE
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

TRIMMING LINE
#1049 Torrington Trimming Line, With Feed Rolls and Scrap Cutter. Capacity for steel or aluminum alloys ⅛" max. Trimmed width 22" min. 66" max. Scrap Length ¾" min. 2¼" max.

UNIVERSAL IRONWORKER
No. 28U-30 Buffalo Armor Plate Universal Ironworker—Combination Punch, Shear & Bar Cutter, Motor Driven Capacities:—Shear 3" Round, 2⅝" Square, 5x5x⅝" Angles 45°, Flats 5 x 1⅜", 12"—31½# Beams, 12—30# Channels, Punch 1½" thru 1¼".

WELDERS
700 KVA Federal Flash Welder, Enclosed Rim Type, 440 Volt, Single Phase, Ring Sizes 4" to 35" Diameter x 12" Wide.
40 KVA Sciaky, Spot Welder, 36" Throat 440/3/60 operation.
250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle, Mechanical Contractor Hi-Pressure Clamp Assembly—NEW 1949.

RITTERBUSH & COMPANY, INC.
50 Church Street, New York 8, N. Y.
Phone—Cort 7-3437

The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Look Eastward, Dealer—Prodded by the two-pronged problem of a slow market and inability to obtain late model machines, some used machinery dealers are casting cautious glances toward Europe.

Exploration of foreign tool markets is not a general trend, however. Most dealers take a dim view of imports because of the risks involved. Those who are showing an interest in European tools reply that they must get machines wherever they are available.

Belgian Buys—One dealer who has tapped overseas sources is Max Wender, president of Montgomery Engineering Co., Detroit. He recently returned from a tour of European trade fairs where he contracted directly for a shipment of Belgian tools including large radial drills and other equipment.

His venture has added significance. It points out the increasing importance of Detroit and other Great Lakes cities as ports as well as the accessibility of Europe to the modern business man.

Inland Imports—All imports for Montgomery Engineering are being shipped directly to Detroit through the St. Lawrence waterway and the Great Lakes. Small freighters able to navigate this route are slow, but direct shipment makes up time that would be lost in transit from an eastern port. In addition, shipping charges are lower.

Although most European tool companies have agents in the U. S., Mr. Wender went directly to the source and avoided middleman dealings. He believes that if a dealer is to obtain the type tools in demand in the U. S. he must go to Europe himself. However, he points out that middle western dealers think nothing of traveling all over the country on business. Europe is only 18 hr away.

No Solution—It is doubtful if foreign dealings such as Mr. Wender's will be of major importance in the used and rebuilt machinery market. There is some resistance to buying foreign tools and complications are sometimes great. Nevertheless, ventures in the European market do highlight the present plight of tool dealers.

Partial Victory — National Industrial Service Assn. is fairly happy over the recent revision to Ceiling Price Reg. 105. The association had originally requested that rebuilt and used electrical equipment be removed from the provisions of CPR 105. Falling short of that goal, the association is at least pleased that some of its recommendations were considered in the revision and that much of the red tape has been eliminated as it was proving a real hardship for small businessmen.

NISA is still hoping it can get rebuilt electrical equipment exempted from the controls of CPR 105 because its prices are generally below ceiling levels. The association believes that nearly all equipment sold by its members as "reconditioned" and "guaranteed" goes at prices which are 65 to 75 pct of the base price, rather than the 85 pct permitted by CPR 105.

The association plans to support its argument for OPS suspension by collecting detailed sales information from its members. It will then be able to prove to OPS that price controls are not needed in the electrical repair industry.

Suspended — Insufficient membership has caused temporary suspension of the activities of the American Rebuilders Assn. The organization hopes to resume its efforts to establish maintenance standards for rebuilt electrical equipment and machine tools after six months or so.